This Week in The Iron Age

Editorial

The Silent Partners 41

Technical Articles

Salt Bath Heat Treating 43
Flame Hardening Standardization 48
Rustless Doubles Capacity 53
Welded Joints Analyzed by Polarized Light 56
Sam Carbis Had an Idea 58
Carbide Tool Prices 60
Corrugated Iron Porcelain Enameled 62
New Gages and Small Tools 63

Feature Reports

On the Assembly Line 68
Washington News 72

News and Market Reports

News of Industry 78
Personals 105
Obituaries 106
Metal Working Activity 107
Comparison of Prices 108
Summary of the Week 109
The Industrial Pace 110
District Market Reports 112
Machine Tool Activity 118
Non-Ferrous Market 119
Scrap Market and Prices 120
Construction Steel 122
Iron and Steel Prices 124
Ferroalloys, Pig Iron Prices 129
Warehouse Prices 130
Sales Possibilities 132

Fatigue Cracks 76
Free Industrial Literature 79
Products Advertised 156
Index to Advertisers 188

Copyright, 1940, by Chilton Company (Inc.)

NOVEMBER 14, 1940

VOL. 146 NO. 20

J. H. VAN DEVENTER
President and Editor

C. S. BAUR
Vice-President and General Manager

C. E. WRIGHT, Managing Editor — J. A. ROWAN, News Editor — T. W. LIPPERT, Technical Editor
F. J. OLIVER, Machine Tool Editor — W. A. PHAIR, Associate Editor — G. RICCIARDI, Associate Editor
F. J. WINTERS, Art Editor — A. I. FINDLEY, Editor Emeritus

Washington Editors
L. W. MOFFETT — JAMES G. ELLIS

Resident District Editors
T. C. CAMPBELL, Pittsburgh — HERMAN L. KLEIN, Chicago
D. R. JAMES, Cleveland — W. F. SHERMAN, Detroit

Editorial Correspondents
W. P. DEARING, Buffalo — ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston — CHARLES POST, San Francisco
HUGH SHARP, Milwaukee — JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario — ROY M. EDMONDS, St. Louis
LEROY W. ALLISON, Newark, N. J.

A. H. DIX, Manager Reader Service

Advertising Staff

Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
Don F. Harner, 1595 Pacific Avenue, Long Beach, Cal.

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents.
Cable Address, "Ironage, N. Y."

Owned and Published by
CHILTON COMPANY
(Incorporated)

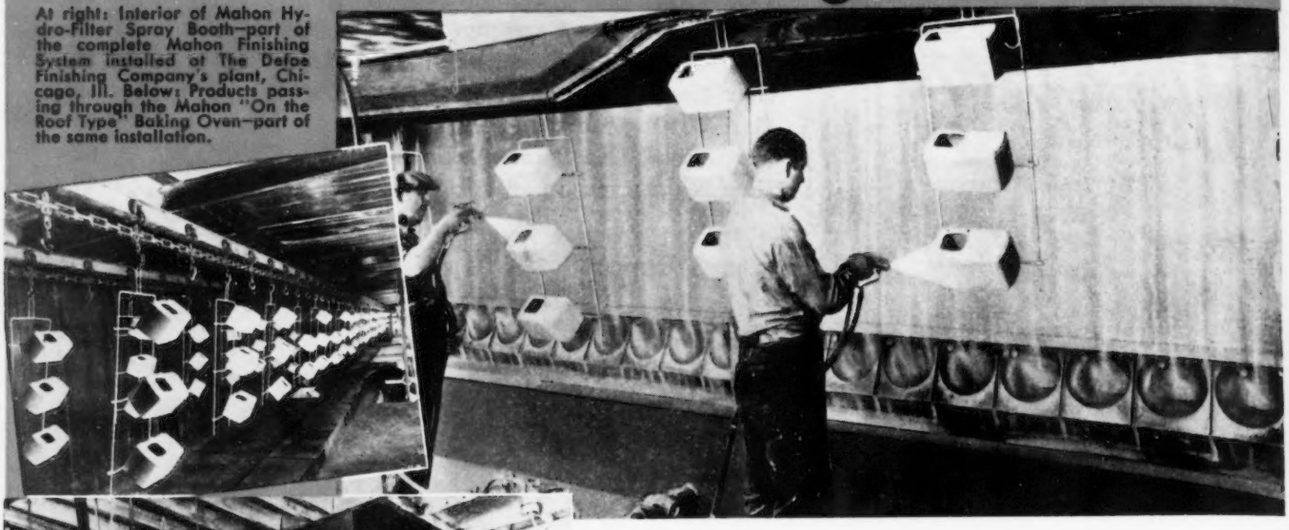
Publication Office
Chestnut and 56th Sts., Philadelphia, Pa. U.S.A.

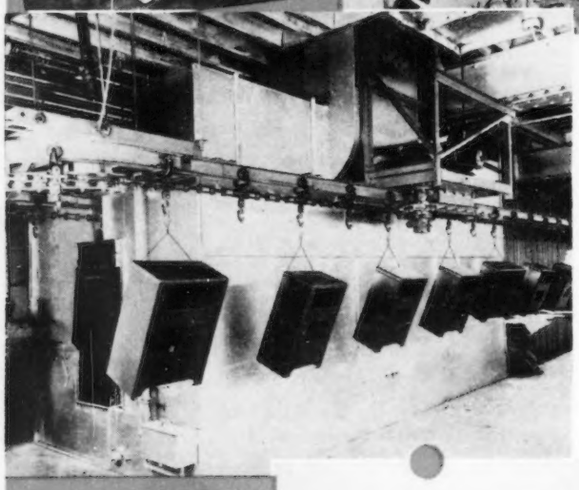
Editorial and Executive Offices
100 East 42nd St., New York, N. Y. U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, President
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY — CHARLES J. HEALE

New, Modern FINISHING EQUIPMENT *will Lower Your Finishing Costs Too!*

At right: Interior of Mahon Hydro-Filter Spray Booth—part of the complete Mahon Finishing System installed at The Defoe Finishing Company's plant, Chicago, Ill. Below: Products passing through the Mahon "On the Roof Type" Baking Oven—part of the same installation.





Exterior of Mahon Hydro-Filter Spray Booth showing products entering on conveyor line. Note inclined housing at right through which products pass to Baking Oven on the roof of the plant—part of the Defoe installation, Chicago, Ill.

Mahon Enamel Baking Oven installed on the roof of The Defoe Finishing Company's plant, Chicago, Ill. This method of handling Drying and Baking Ovens saves much valuable floor space within the plant.

. . . Mahon Engineers Will Design a Complete System

In production finishing today the right type of equipment is of greater importance than ever before . . . thorough engineering and proper coordination of the various units of equipment necessary in the Cleaning, Rust Proofing and Finishing process is absolutely essential to insure satisfactory results in continuous operation. That is why manufacturers throughout the country, like the Defoe organization in Chicago, turn their entire Finishing Equipment problem over to Mahon engineers . . . they do it with complete confidence—because, they know that Mahon engineers, backed by seventeen years of research, development and practical experience in this highly specialized field, are better qualified to design the type of Finishing System that will produce the desired results at the lowest possible cost in each individual case. The wealth of knowledge and practical experience, gained by Mahon engineers through close contact with production experts in every industry where Finishing is a major production operation, is available to you. Call in a Mahon engineer now—consultation and study of your requirements will not place you under any obligation.

THE R. C. MAHON COMPANY

DETROIT - - CHICAGO

Designers and Manufacturers of Complete Finishing Systems, Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Units, Hydro-Foam Dust Collectors and many other Units of Special Production Equipment.

MAHON

The Iron Age

NOV. 14, 1940

ESTABLISHED 1855

The Silent Partners

"I SEE by the papers" that the Warner & Swasey Co. of Cleveland earned $1.93½ per share during the third quarter of this year. Now there is nothing very surprising about this, for as all of our readers know, this machine tool building concern has able management and lots of business.

But the account goes a step further and discloses that of the $1.93½ per share earned by this company, the Federal levy was $1.10, leaving 83.5 cents available for dividends and surplus.

Of course this $1.10 per share in taxes is Federal only and does not represent what the State and municipality take also.

Again there is nothing surprising in the fact that Uncle Sam is making a heavy levy on profits wherever they appear. The money has to be raised somewhere to pay for our defense program as well as the ordinary costs of Government. And it is better to take it out of profits than out of principal.

The wage earners who work for Warner & Swasey and other companies that are earning a profit are not likely to complain of this tax policy of the Government. They would rather see the money come from profits than from their breadbaskets which already carry a heavy tax load. As for the stockholders, they haven't any say in the matter since they take the third helping, after Uncle Sam and the State have reached out for theirs.

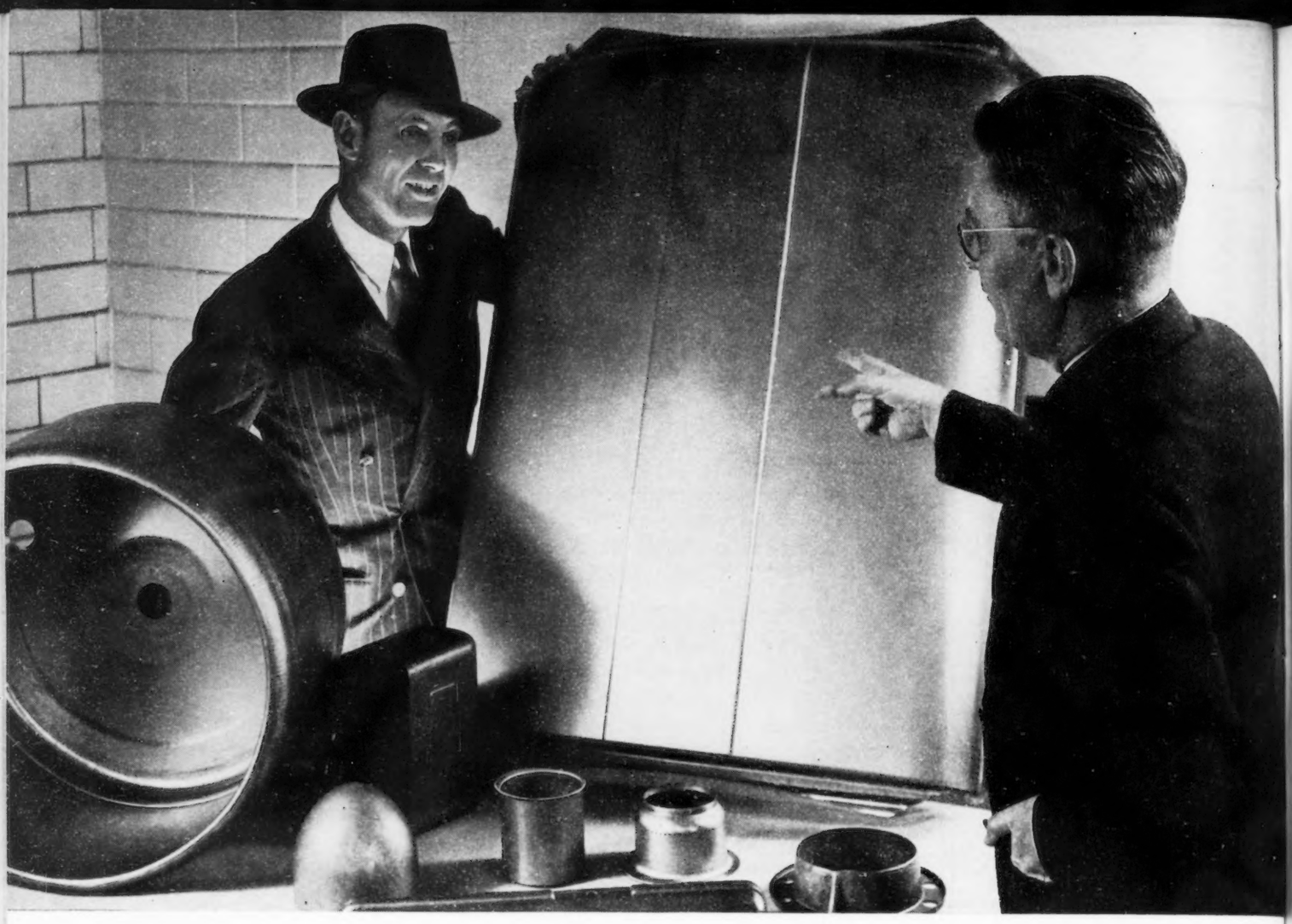
Now in citing this particular company, I am not taking an exception, for taxes per share in many concerns today are higher than net-after-taxes per share. And as the full effect of the new tax bill comes into play, the concern in which such is not the case will probably be the exception. Business men will reconcile themselves to this because it is inevitable under the circumstances.

But think of it from this angle: Uncle Sam and labor are then the chief beneficiaries of the earnings of industry. Their claims are preferred.

In the third quarter of 1940, 57 per cent of the efforts of the Warner & Swasey Co. were devoted to earning profits for Uncle Sam and 47 per cent of them were devoted to earning profits for dividends and surplus, after, of course, subtracting the major efforts that went to meet the payroll.

Under these circumstances, with Government and labor as the chief beneficiaries of our American enterprise system, isn't it reasonable to ask and expect that these big silent partners will exert every effort to make and keep these enterprises sound and profitable?

That is a thought to think about while we are talking about a united America!



Difficult Jobs Have Made INLAND SHEETS Famous

WHEN you are faced with a tough forming job turn to Inland Sheets. They are being successfully used for extra deep draws, difficult spinning operations, deep corner draws, etc., by many leading manufacturers. Inland Sheets have become famous because they perform so well on the most difficult jobs.

One reason for this is metallurgical cooperation. Inland extends this service to its customers for the solution of old as well as new forming problems. No longer is it necessary to select steel by the costly and laborious cut-and-try method. Take the short cut—the way that gets quickest and best results—get in touch with Inland. Let one of our metallurgists visit your plant to study your product and your sheet needs. He will write a specification that will be followed to the letter by the Inland mill.

You will get highest quality, uniform sheets that will fabricate economically, and make your products more acceptable at point of sale. You will then understand why Inland service and Inland Sheets are famous.

If yours is a difficult job, it is more than ever a job for Inland Sheets. Write, or call, your nearest Inland office.

SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATES · STRUCTURALS · PILING · RAILS · TRACK ACCESSORIES · REINFORCING BARS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati

Salt Bath Heat Treating

—In automobile and tool plants, liquid salt baths are finding wide application for cyaniding, carburizing, selective hardening and annealing, hardening high speed steel tools, etc.

By W. F. SHERMAN
Detroit Editor, The Iron Age

THE molten salt bath has been recognized widely as providing, through the immersion principle, a group of practical advantages in heat treating that includes immediate and complete sealing of the work from contact with the air, faster heating of the work by conduction, rather than by radiation or convection, and certain opportunities for doing selective hardening work under closely controlled conditions.

Contributing to a broader and more general adoption of the liquid salt bath has been a new operating factor —the direct heating of the liquid salt by means of the salt's own resistance to the flow of current between immersed electrodes.* This has, among several other advantages, increased pot life and greatly reduced general furnace maintenance. Demonstrated in the Ajax-Hultgren electric furnaces, which use the electrode heating principle, this absence of flame from direct impingement against pot walls has increased pot life from the usual one to six weeks, to more than a year, in many typical installations. In the automobile and affiliated parts industry there has been a consequent constant increase in interest in this type of equipment.

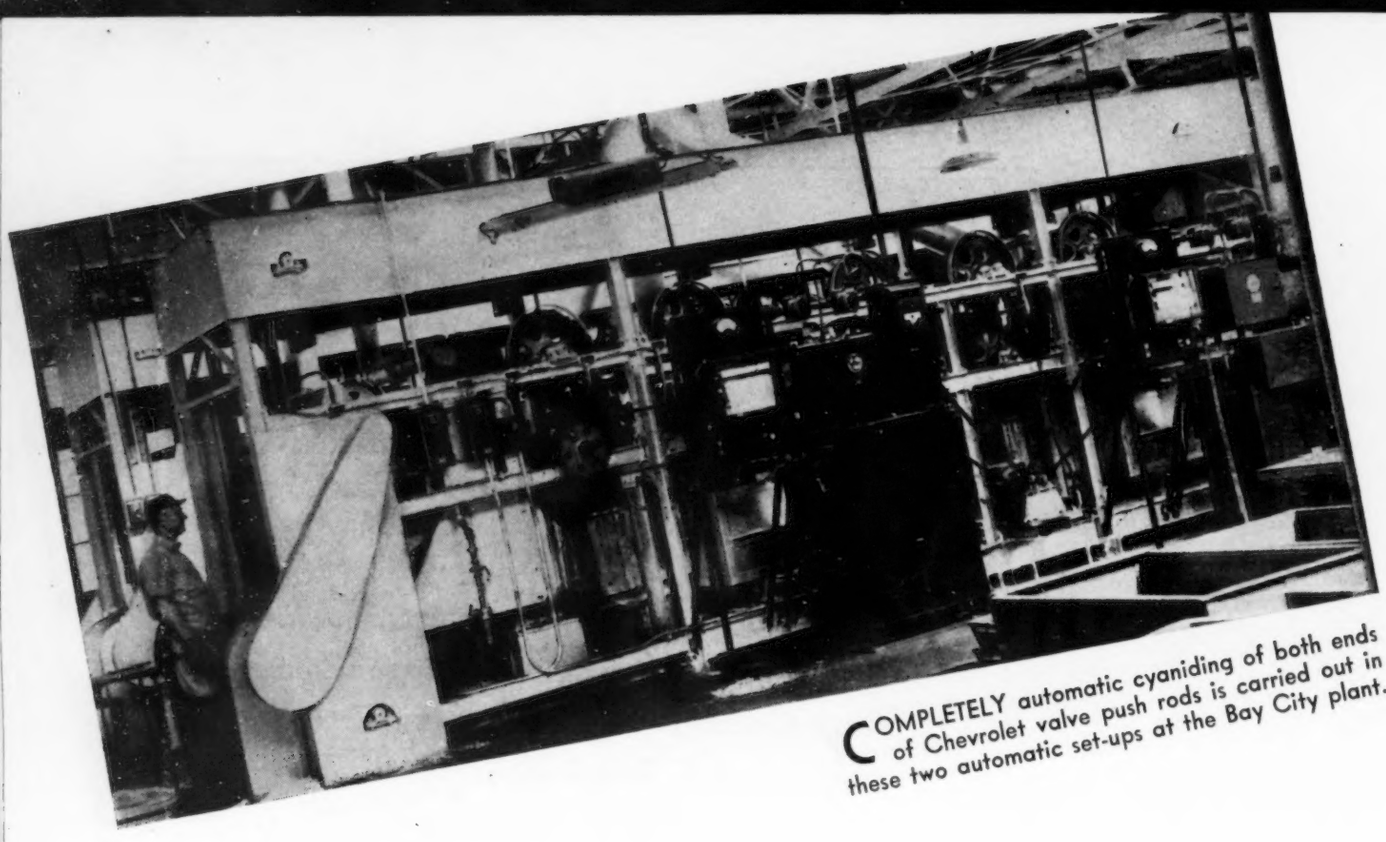
Still further impetus to interest in the modern salt bath lies in what amounts to a minor revolution in the tool steel field, where at least one prominent manufacturer refers to a possible war-induced shortage of tungsten, to explain a switch now to molybdenum tool steels and the recent adoption of the electric salt bath heat treatment of this material. Some molybdenum steels decarburize readily in atmosphere, even in controlled atmosphere, whereas this material and also cobalt steels are safe from decarburization when immersed in the protection of a proper salt bath.

The entire range of heat treating operations from 300 deg. F. to 2400 deg. is bracketed by available salt bath equipment. Applications include cyanide hardening, liquid carburizing, hardening in neutral baths, selective hardening and annealing, tempering, hardening of high speed steel tools and dies, annealing, and treating of age-hardening metals. More recently the salt bath has been developed as a brazing medium, and is now in use for heating steel rods, tubes and shapes for upset and press forging operations.

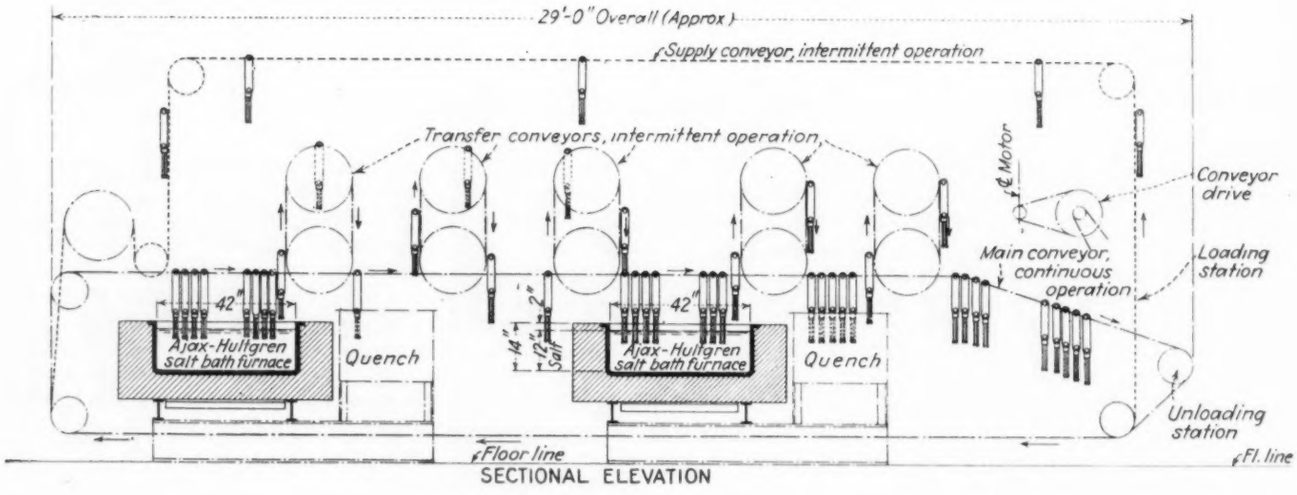
Within the automotive industry, job lot and mass production applications are both to be found, along with some interesting examples of single-purpose automatic installations, that are not likely to be found elsewhere very often. Reasons peculiar to each plant have governed the selections of equipment, but, in the main, choice of the electric salt bath is determined by considerations of pot life and maintenance, elimination of decarburization of such materials as molybdenum alloy steels and the high carbon types, as already mentioned, adaptability to selective heating, cleanness, low external temperatures and better working conditions for operators around the installation, reduction of time cycle because of faster heating, and reduction in sand blast required to clean parts, etc.

A normal division of electric salt bath installations into low-heat and high-heat groups occurs. A majority of the furnaces in use fall in the former classification because of the quantity and nature of the materials being treated at the lower (approximately 1450 to 1700 deg. F.) temperatures. These low-heat installations most frequently encountered are cyaniding, case hardening or carburizing operations. The high-heat applications are con-

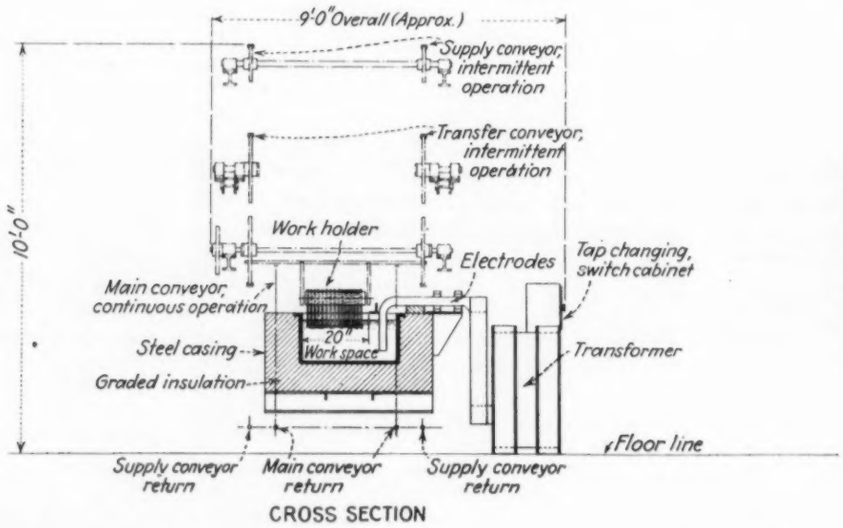
*See THE IRON AGE, Oct. 15, 1936, p. 42; March 28, 1940, p. 48.



COMPLETELY automatic cyaniding of both ends of Chevrolet valve push rods is carried out in these two automatic set-ups at the Bay City plant.



SECTIONAL ELEVATION



CROSS SECTION

DIAGRAMMATIC drawings showing the mode of travel in the Chevrolet salt bath installation at Bay City. Two installations of this type handle 24,000,000 push rods in each year.

cerned with the treatment of the usually difficult high-speed steel tools and special dies.

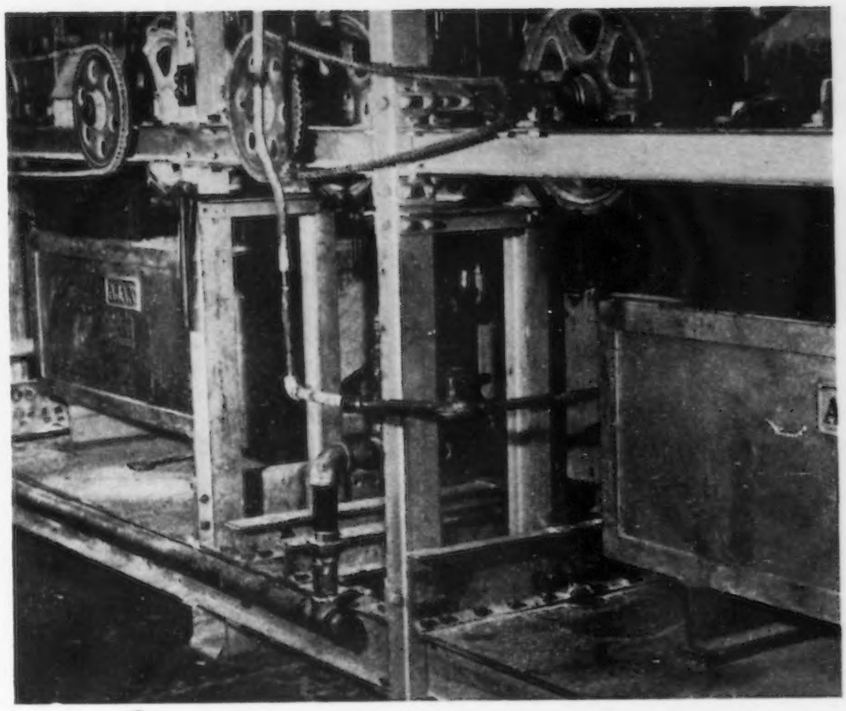
Packard Motor Car Co. makes use of an electrically heated cyanide pot to case-harden transmission synchronizer brake housings and oil pump gears, for selective hardening parts of the transmission shifter forks, and oil-hardening clutch rings which weigh 1½ lb. each. Regularly the charge is either a mixed batch of 20 forks and 15-20 gears, or 70 of the clutch rings. Transmission synchronizer housings are case-hardened to a depth of 0.005 to 0.006 in. and require a time cycle of 30 min. The hardening of the clutch ring takes a half hour also. Treatment of the 70 clutch rings, plus heating of ten 1-lb. fixtures which are immersed, costs about 0.1c. per lb. for current used, it is estimated. The material is SAE 1020 steel for all the parts except the clutch rings, which are SAE 5140.

While distortion had previously been a factor in the heat treatment of clutch rings, since the salt bath was put into use distortion rejections have been less than 1 per cent. The indication is that the uniform heat of the current agitated salt bath has materially reduced the distortion tendencies.

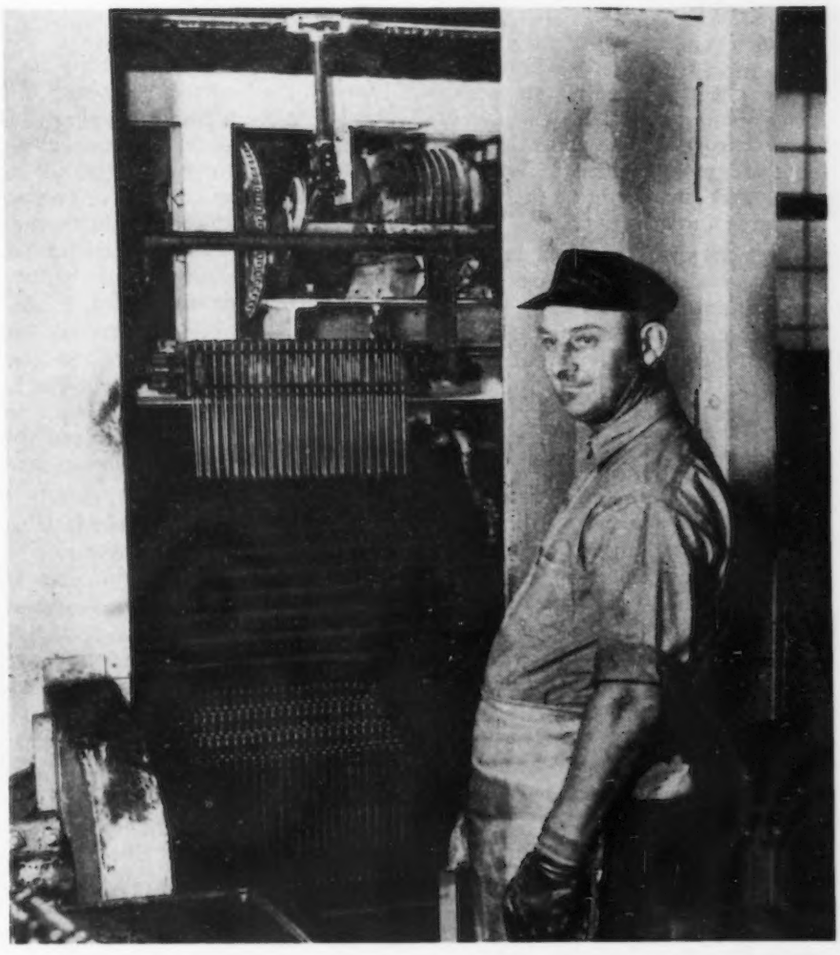
Temperatures in the Packard installation range from 1450 deg. to 1500 deg. F. in the pots, which are of welded steel plate, with a working space of 12x24 in. Performance records show pot life to be approximately one year.

A completely automatic cyaniding operation is performed on more than 24,000,000 push rod ends each year in the small parts plant of Chevrolet at Bay City, Mich. Two furnaces are installed to handle this volume of work. This represents the heat treating of the two ends of the 12 valve push rods for more than a million engines every 12 months. The material is X1040A hard-drawn wire which has an initial hardness of 95 Rockwell B. After inspection for seams, the material is cut off in 12½ in. lengths on a Brown & Sharpe cut-off machine and then is run through slot-type, gas-fired furnaces to heat each end separately, to cherry red heat. The ends are upset in three-stage dies in National forging machines. One end is upset to form a ball and the other has a cup-shaped depression in a mushroomed end. Sand blast follows the forging, and then the surfaces are coined, again in National forging machines.

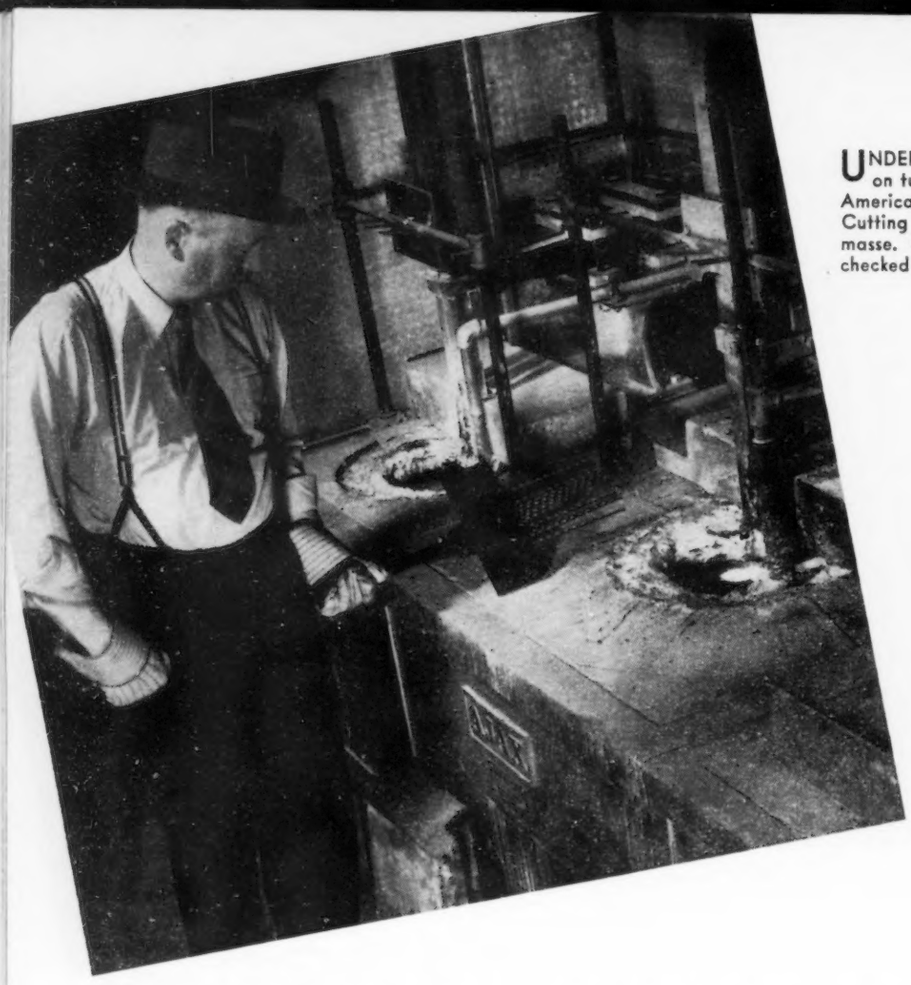
For the cyaniding operations, the



CLOSE-up of salt bath pot for the treatment of valve push rod ends.



LOADING end of the conveyor which carries valve push rods through two cyaniding and the quenching operations. Forty-eight push rods are placed in a rack at one time and hung from the conveyor.



UNDERGOING a changeover from 100 per cent operation on tungsten steel to heat treatment of molybdenum alloys, American Twist Drill Co., Detroit, makes use of this installation. Cutting tools of many sizes and weight are heat treated en masse. Cleanness of the finished tool—so they can be easily checked for straightness—is one of the advantages cited here.

o o o

rods are put in fixtures—48 rods at a time—and suspended from a transverse shaft, each end of which is suspended from a chain conveyor in the single-purpose, automatic cyaniding unit, each incorporating two Ajax-Hultgren furnaces.

Two conveyors are used inside the furnace enclosure. One merely carries the fixture from the loading station upward to the top of the furnace enclosure, along the length of the unit and down at the far end, to deposit the loaded fixture on a similar chain conveyor which carries the part through the heat treating process.

When the fixture and rod are deposited on this second conveyor, the ends of the rod, about 1½ in. of the rod length, are immersed in the cyanide. Nine fixtures, containing a total of 432 rods, are thus suspended at one time in a rectangular welded steel pot which is 2x3x1 ft. deep and contains 800 lb. of salt.

As each new charge is deposited in the bath, the conveyor moves forward and lifts out one of the nine fixtures, then dips into quenching water one batch of 48 rods. Between entering the cyanide bath and removal for the quench the period is about 8 min. After quenching, the rods are suspended over a gas-heated hot plate to remove all moisture.

At this stage—just after the quench—an automatic turnover flips the fixture so the heat treated portion of the rod is at the top and the other end of the rods are ready for the cyanide dip in a similar furnace pot at the next stage along the conveyor. The turnover is accomplished when a gear on the fixture meshes with teeth on a rack on the furnace structure so the fixture is revolved through 180 deg.

The second cyanide bath is similar to the first, but a blast of air is kept blowing over the surface of the bath to keep the heat from rising and drawing the finished upper ends of the rods.

Following the second quench, the rods are sprayed with soluble oil and unloaded from the conveyor.

Use of 1040 steel for the push rods presented a problem of decarburization which had to be guarded against. The salt bath has proved satisfactory and gives a file-hard case (60 Rockwell C) about 0.002 in. thick. This, along with the ease of selective hardening of the push rods, led to the choice of the salt bath.

The furnace temperature for cyaniding is 1500 deg. Pot life in this case, also, has proved to be about one year.

Rejections from the surface hardening process are negligible, although distortion is necessarily corrected before the rods are put into service. Straightening of the rods is accomplished with power-driven rollers in a later operation.

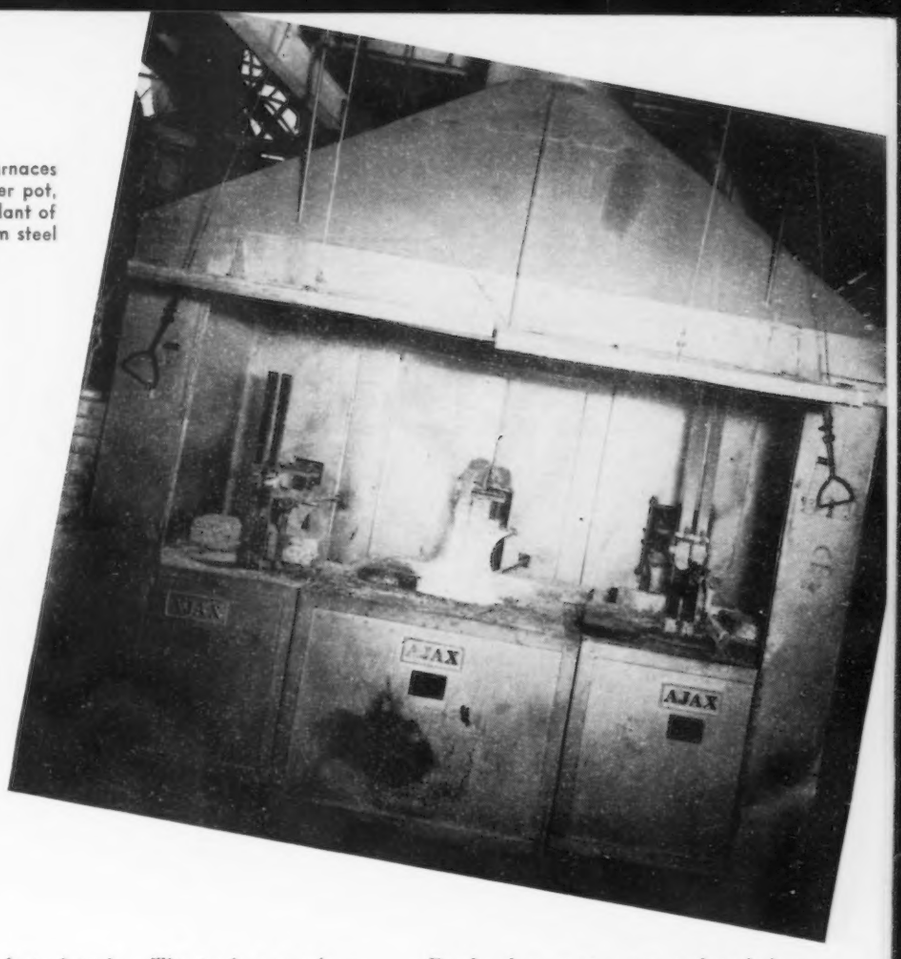
On the two cyaniding operations just described, at Packard and Chevrolet, over-all costs are reported lower than those encountered previously in the same operations.

A second Chevrolet plant which is making use of electrically heated salt bath furnaces is the motor plant at Flint where the principal use for the installation is the heat treating of molybdenum and tungsten high speed steels. The tungsten (an 18-4-1 material) is treated to get a final hardness of Rockwell C 63-64, the molybdenum steel (9-4-2) is treated to get a hardness of Rockwell C 64-65, a molybdenum hot-work steel used for special extrusion dies, which must operate at high temperatures, is heat treated to give a hardness of Rockwell C 58-60.

For this type of work, Chevrolet has three electrically heated salt bath furnaces in a single battery, including pre-heat, high heat and quenching pots, although it is indicated that operations would be speeded if two pre-heat pots were provided to keep materials flowing more steadily to the high-heat pot. Since all of the materials treated here must be tempered, or drawn, three lead pots operating at 1000 to 1150 deg. are provided.

The charge for these pots, whether cutting tools or special valve extrusion dies, is approximately 25 lb. The pre-heat furnace is operated at 1500 deg. and the quench at about 1250 deg., while the high-heat furnace is varied, depending upon the material being heated. The molybdenum steels are brought up to 2100 to 2250 deg. and the tungsten materials are heated to 2200 to 2350 deg. Similarly, the temperatures of the lead drawing pots are varied to obtain the desired hardness in the finished parts.

Considerable experimentation with salt has been done in this installation. Use of sodium potassium chlorides in the pre-heat furnace, a silicate in the high-heat furnace, and a combination carbonate and cyanide in the quench furnace proved to be causing pits in the surface of tools. On the other hand, the adoption of cyanide salt for pre-heat and quench, with barium chloride properly rectified in the high-



THREE Ajax-Hultgren electrically heated salt bath furnaces including pre-heat, at the left, high heat in the center pot, and quenching pot at the right are used by the motor plant of Chevrolet at Flint, Mich., for heat treating molybdenum steel and tungsten high speed steel.

o o o

heat furnace, proved more satisfactory as regards surface condition of the tools which are treated, but has caused some difficulty because the tools do not come out of the quench clean enough to be checked immediately for straightness. The difficulty is that by the time the tools are cleaned enough to be gaged for straightness, they have hardened so that mechanical straightening is difficult. Some light is thrown on this problem, however, by a technique which will be discussed shortly.

It is reported that on the high-heat furnace in this installation, electrode life is about two weeks for each setting of the electrodes, or about six weeks total life; in this regard, somewhat longer electrode life is obtained with the silicate than with barium chloride.

However, maintenance on high-heat pots has been very much reduced. Pot life considerably in excess of 2500 hr. at maximum heat has been experienced. (It is the practice in this plant, nevertheless, to install a new pot at a maximum of 2500 hr.) Average life (high-chromium cast steel pots are used in all high-heat furnaces) is approximately 2000 hr. The quench pot in this installation has never been pulled and it has been in service approximately two years. The pre-heat pot has a service life of about one year.

This long pot life is fairly typical of the electric salt bath furnace. In general, instances encountered in the field show a replacement life of about a year with cyaniding pot operating at about 1500 deg. F., while high-heat equipment, operated between 2000 and 2400 deg. F., gives a maximum pot life of 2700 to 3500 hr. at heat, with the average life determined, of course, by the specific operating conditions.

Undergoing a change-over from 100 per cent operation on tungsten steel to the heat treatment of molybdenum alloys, the American Twist Drill Co., Detroit, has experienced no important differences in its heat treating requirements. The electrically heated salt bath furnaces were installed with the change-over (from tungsten to molybdenum) in mind and the operations in the plant are illustrative of the exacting requirements of treating high speed steel tools. The tools are selectively hardened to the shank to a hardness of 62-65 Rc.

This firm operates four Ajax electric salt bath furnaces—two pre-heat furnaces (1400 to 1600 deg.), one high-heat furnace, and a quench bath operated at 1100 to 1200 deg. Charges consist of anything from one tool up to 400 at a time in pots that are 12x12x18 in. deep. The process consists of the usual pre-heating essential before the tool is subjected to the extreme temperatures of the hardening heat, then the high heat, and finally the quench, followed by drawing in a Homo electric furnace operated at 1050 deg.

Use of the salt bath for the quench is in accord with the general practice to quench tool steels in a salt bath but it also provides a cleaning action which permits accurate checking of the distortion present in the heat treated tools. This cleaning is accomplished through careful selection of salts used. In the high-heat bath, the American Twist Drill Co. uses a Park Chemical Co. patented salt containing barium chloride and a deoxidizer (silica); the quench salt contains a small amount of cyanide and is designed particularly to act as a solvent for the barium chloride. In turn, the quench salt is quickly soluble in water so the tool comes from the heat treating operation in an extremely clean condition, suitable for checking and straightening before drawing.

Production costs are reduced because of the small amount of sand blast and shot blast that is required on this tool company's high output of drills, reamers and similar tools. Also, the company stated that less straightening is required. The faster heating of the salt bath has reduced operating time about 40 per cent.

Investigation reveals a general preference for unit furnace installation, rather than the battery type enclosed in a single hood. This opinion of the heat-treaters prevails at least in cases where mechanization is not a factor. This preference is based on the contention that periodical maintenance work is more easily done if each pot is in a separate installation where it is not necessary to work close to other pots which are up to working temperatures. Of course, where the work is not transferred from pot to pot manually, but is moved mechanically as in the conveyorized installations, it is conceded that the furnace pots must be located side by side and that a single enclosure is satisfactory.

The "control of atmosphere" around the work and remarkable adaptability to selective heat treating operations assure the continued use of the salt bath, it is indicated, while the economy, uniformity, flexibility and production speed embodied in these installations give promise of continued development of the art.

Flame Hardening Standardization

By A. L. HARTLEY
Metallurgist, R. K. LeBlond Machine Tool Co., Cincinnati

ALTHOUGH the subject can only be considered in a general way, a basic understanding of the factors which cause distortion of flame hardened parts is of vital importance in determining the type of part which can be successfully flame hardened.

The distortion which takes place as a result of any hardening method is usually caused by strains set up within the part. These strains are caused by two basic factors, namely non-uniform volume increase caused by the formation of martensite in localized areas or hot upsetting of certain sections due to uneven heating or cooling rates.

If either the material or method of heat treatment is such that the volume increase caused by the formation of martensite is not uniform throughout the part, internal strains will be set up. The two illustrations as shown in Fig. 31 are typical of parts of such a design that strains caused by this factor will produce distortion. If the stresses due to this volume increase are the only ones considered, it would be reasonable to assume that they would be of comparable magnitude in the above parts, even though they were produced by entirely different procedures. In both instances the hardened layer would tend to elongate, and this action would be resisted by the base metal which did not have the martensitic structure.

The second factor which must be considered is the strains caused by the hot upsetting. In the case of the flame hardened specimen, Fig. 31-A, the base metal is cold and only the surface layer is heated. This layer tends to expand when the heat is applied, but is resisted by the cold base metal. Thus the top layer which is being flame hardened is hot upset. When the hardened surface cools it tends to contract and become shorter than its original length. However, it must be remembered that the volume change due to the formation of martensite increased the length of the hardened layer. That is, in the instance of the flame hardened part the forces set up due to volume change are counteracted by those produced by the hot upsetting. However, it will be shown later that these forces do not balance.

In the case of the carburized part, Fig. 31-B, the entire section is hot when the part is quenched. The surfaces exposed to the quenching medium are cooled rapidly and tend to contract. Since the core is still hot it is hot upset. When the entire part reaches a uniform temperature the core then tends to have a shorter length than it originally had. That is, in the case of the carburized part the strains caused by the hot upsetting must be added to those produced by the volume change due to the formation of martensite in the case.

The fact that the stresses in a part of this general design are less in a flame hardened part than in a carburized part is indicated by the figures previously stated where it was shown that the distortion in a large rectangular steel bar was reduced approximately 85 per cent when the heat treating method was changed from carburizing to flame hardening.

Although a very complete series of experiments would be required to accurately evaluate the magnitude of these forces, a few elementary tests will indicate their general trend. Two rectangular blocks, one of SAE 4145 steel and one of chromium-molybdenum cast iron (type No. 3) ¼ in. thick by 1¼ in. wide by 5 in. long, were heated to 1575 deg. F. and quenched. The steel block expanded 0.0012 in. per in. of length, and the cast iron sample expanded 0.0023 in. per in. of length. This expansion was due to the volume increase caused by transforming a pearlitic structure to a martensitic structure.

As illustrated by the photomicrographs shown in Fig. 17, 21, 22 and 30, the structures produced in the flame hardened case of cast iron or steel of the types considered is martensitic. Therefore, it would be reasonable to

Note: A very complete discussion of the stresses produced by quenching of steel parts appears in the book "Tool Steel Simplified," by Frank R. Palmer.

assume that the volume change due to flame hardening would tend to cause an equivalent amount of expansion. If the resisting forces due to the hot upsetting action are momentarily disregarded, and it is assumed that the specimens of which the flame hardened surfaces are a part are absolutely rigid and no elongation takes place, the internal stresses would be 36,000 lb. per sq. in. in the SAE 4145 specimen and 36,800 lb. per sq. in. in the cast iron specimen. These values are based on the fact that the modulus of elasticity of steel is 30 million, and that of cast iron is 16 million. Although more exhaustive tests might prove that the above figures are quantitatively inaccurate, they at least serve to indicate the fact that there are very appreciable unbalanced internal strains set up by any method of hardening which produces a martensitic layer on one surface of parts of the general design as shown in Fig. 31.

However, as previously stated, the forces due to hot upsetting must be considered before the actual internal stresses which exist in a flame hardened part can be accurately evaluated. To approximately evaluate the magnitude of these the 2 in. surface of a bar of SAE 1020 steel 1¾x2x12 in. was subjected to the same flame treatment which would be used to flame harden the corresponding surface of a piece of SAE 4145 steel. A rectangular specimen 1¾x2x4 1/32 in. long was taken from the middle section of the original bar. The ends were ground square and to a length of 4.000 in. A ⅛ in. thick wafer was taken from the heated surface. The length of this wafer was found to be 0.0006 in. shorter than that of the original 1¾x2x4.000 in. block. That is, the flame treatment had produced a hot upsetting action which would tend to shorten the surface layer of the metal, but this shortening had been resisted by the greater strength of the cold base metal. When the resisting forces of this cold base metal were released by cutting off the ⅛ in. thick wafer the heated surface contracted 0.000125 in. per in. of length. (0.0006 ÷ 4 = 0.000125.)

Although it is fully appreciated that SAE 1020 steel is not the most desirable material for a test such as this, the results obtained clearly indicated that the magnitude of the hot upsetting action is much less than that of the expansion due to the volume increase.

A rectangular test block 1½x1½x 4 1/32 in. long was machined from a 12½x7x12 in. block of SAE 4145 steel which had been flame hardened in accordance with the data as tabulated in the curve in Fig. 20. The ends of this specimen were ground to a length of 4.000 in. and the soft base metal machined off, leaving the ⅛x1½x4.004 in. hardened wafer. That is, the length of this specimen as checked with micrometers was 0.004 in. longer than the original test block. This was an expansion of 0.001 in. per in. of length which took place when the forces exerted by the base metal were released. That is, the internal stresses were 30,000 lb. per sq. in. (modulus of elasticity of steel 30,000,000). These values are in very close agreement with the previous results, in which it is shown that the volume increase due to the formation of martensite caused an expansion of 0.0012 in. per lineal inch, and the hot upsetting action caused a contraction of 0.000125 in. per lineal inch. That is, on the basis of these figures the actual expected expansion of the flame hardened part would have been (0.0012 − 0.000125 in. = 0.001075 in. per in. of length).

IN the four previous sections of this highly informative report, the author described the characteristics of three types of iron, and the effect of heat treatments on the microstructure and hardness of each material; data on the flame hardening of unalloyed, Cr-Ni and Cr-Mo cast iron by the progressive method; standardized operating conditions for hardening flat surfaces; procedure for hardening steel parts, large gears and long cylindrical parts. Herein, in conclusion, attention is directed toward distortion of flame hardened parts, and the design and use of special tips.

A chromium-molybdenum (type No. 3) alloy cast iron bar 2x3x24 in. was flame hardened on the 2 in. surface. A 4 1/32 in. long section was taken from the central part of this specimen, and the ends ground to a length of 4.000 in. The soft base metal was machined off and the length of the hardened wafer was found to be 4.004 in. long. That is, the wafer had expanded 0.001 in. per in. of length. As previously stated, the volume increase in this type material due to the formation of martensite was 0.0023 in. per in. of length. This would indicate that in the case of cast iron the hot upsetting was appreciably more than in the case of the steel specimen. That is (0.0023 − 0.001 = 0.0013 in.), the difference between the expansion which occurred when a 4 in. wafer of cast iron was furnace hardened and when a 4 in. wafer of flame hardened cast iron was removed from a rigid block. That is, the hot upsetting had tended to reduce the length of the surface layer 0.0013 in. per in. of length, and the volume increase due to the formation of martensite has tended to increase the length 0.0023 in. Hence the resultant expansion which occurred was 0.001 in. per in. of length. The force required to prevent this expansion, i.e., the internal forces in the block, were 16,000 lb. per sq. in. (modulus of elasticity of cast iron 16,000,000).

It can be readily appreciated that parts having unbalanced internal forces of this magnitude would tend to distort. If a part is of very rigid box type design, this distortion may not be of appreciable magnitude at the time of hardening, but if some precautionary measures are not taken to relieve or balance these forces, there is always the possibility that further distortion will take place when the part is put in service.

To study the effect of stress relieving flame hardened parts several rectangular specimens 1½x1½x4 1/32 in. were taken from the hardened surface of a 12½x7x12 in. long test block which had been flame hardened in accordance with the data as tabulated on the curve in Fig. 20. The ends of these specimens were ground to a length of 4.000 in. Half of them were stress relieved at a temperature of 400 deg. F. for a period of 2½ hr. The soft base metal was then machined from all of the samples and the lengths of the hardened wafers were checked with micrometers. The average expansion per inch of length of the stress relieved wafers was 0.0006 in., and the average expansion per inch of length of the wafers taken from the specimens which had not been stress relieved was 0.001 in. per in. of length. That is, the stress relieving treatment reduced the internal stresses approximately 40 per cent. This definitely indicates the advisability of stress relieving flame hardened parts wherever such treatment is practical. However, as will be shown later, this statement must not be misinterpreted to mean that the distortion in a part is reduced by stress relieving because in many instances it will be very greatly increased, this being especially true where long narrow parts are flame hardened on one side only. The stress

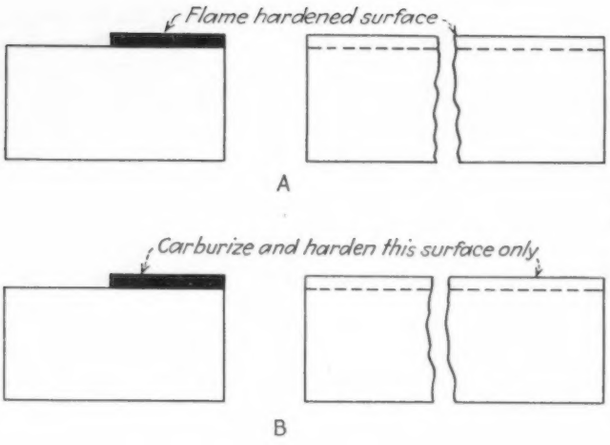


FIG. 31—This part is typical of a design in which internal strains will produce distortion. The stresses are less in the flame hardened part than in the carburized part.

relieving treatment does definitely reduce the internal strains, and in this manner eliminates the hazard of the part distorting after it has been finished and put in service.

A brief analysis of the distortion characteristics of parts flame hardened on a production basis will clearly illustrate the advantage of balancing the stresses set up by this method of heat treatment. Long steel bars which range in size from 7½x2½x55 in. to 7½x14½x63 in. are regularly hardened on four sides and the distortion is very slight. Although these bars are stress relieved at 400 deg. F., to reduce the magnitude of the internal forces, this treatment does not affect the distortion. Accurately standardized hardening procedure produced balanced internal stresses on these parts, and the stress relieving treatment reduced them to a minimum. Although parts of this type have been in service for the past year under operating conditions which subjected them to heavy intermittent loading, they have showed no tendency to distort.

The part shown in Fig. 32 is made of chromium-molybdenum alloy cast iron (type No. 3) and flame hardened under the conditions as shown in the above figure; the hardened surface distorted approximately 0.010 in. concave. However, when the part was stress relieved at a temperature of 375 deg. to 400 deg. F. for a period of 3 hr., it distorted an additional 0.040 in. and the flame hardened surface was 0.050 in. concave. This definitely indicated that the internal stresses were of a very appreciable magnitude, and if the part was not stress relieved it would very likely distort when put in service.

In order to definitely establish the fact that the distortion was caused by the lengthening of the martensitic areas, one of the parts was clamped on a heavy table in such a manner that the surface which had been 0.050 in. concave was 0.0625 in. convex. It was then placed in a large furnace and stress annealed at 400 deg. F. for 12 hr. This treatment did not appreciably change the shape of the part. That is, the side on which the flames were applied remained 0.050 in. concave. Although a part of this design flame hardened and stress annealed would not distort in service, it would be very expensive to grind 0.050 in. from the surfaces which had to be finished. To avoid the necessity of this excessive grinding stock, the internal stresses were balanced by flame hardening the opposite side. When this procedure was followed the stress relieving treatment did not increase the distortion but only reduces the internal stresses which are present. These parts are regularly processed on a production basis, and the distortion rarely exceeds 0.005 in. to 0.010 in.

A second series of tests on a part made of the same material, namely chromium-molybdenum alloy cast iron (type No. 3), was conducted to show the results of clamping a long slender piece in a bowed position during the flame hardening operation. The part as shown in Fig. 33 was placed on a long table and submerged ¾ in. in water. The surfaces as illustrated in Fig. 33-B were flame hardened. This part distorted so that the surface A was 0.125 in. concave. A second part

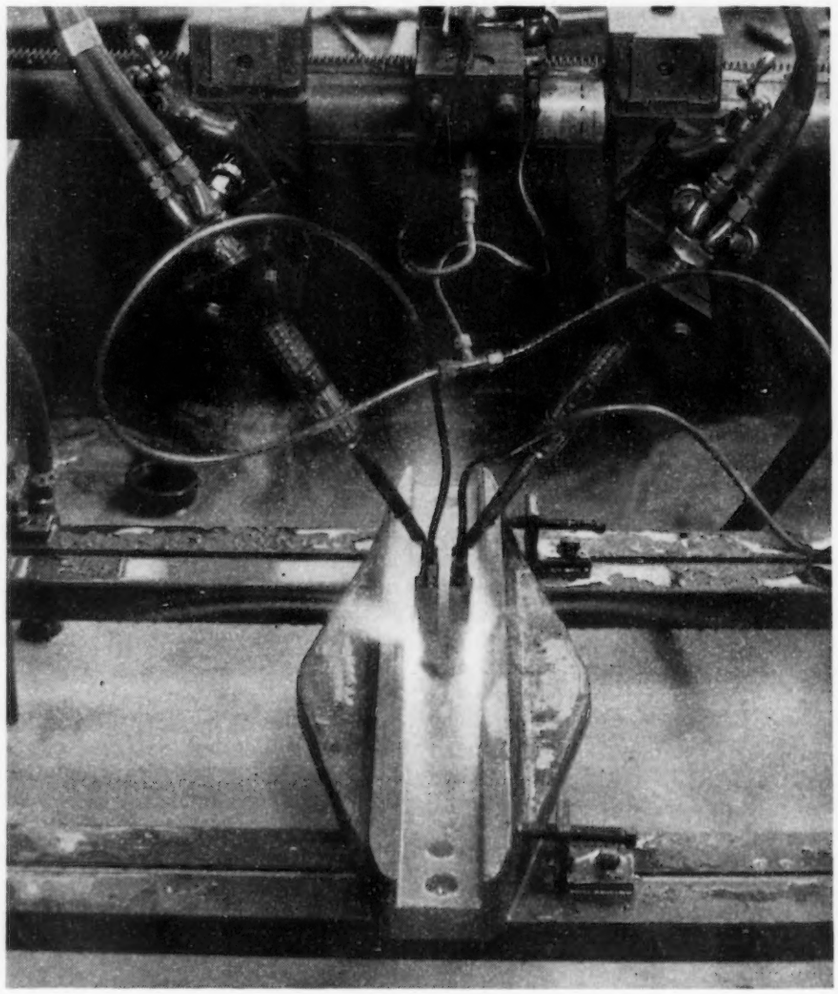


FIG. 32—This chromium-molybdenum alloy cast iron part distorted about 0.010 in. concave when flame hardened.

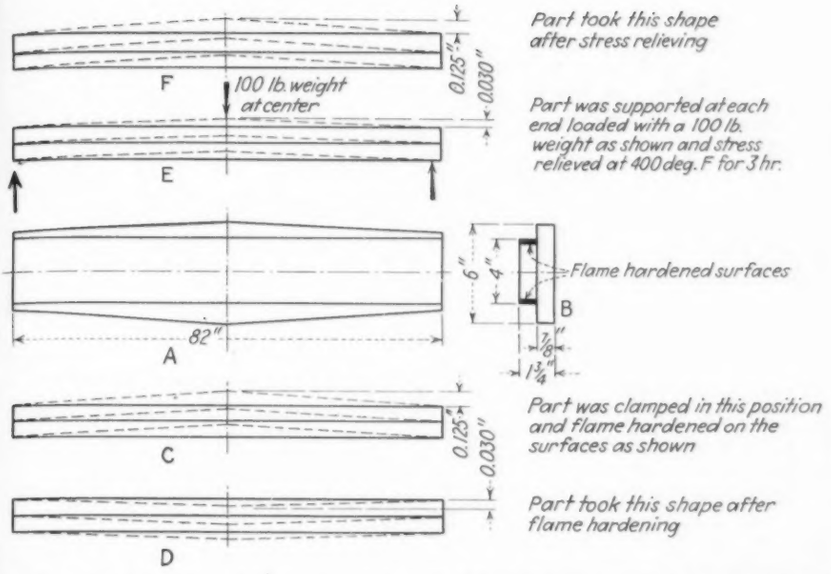


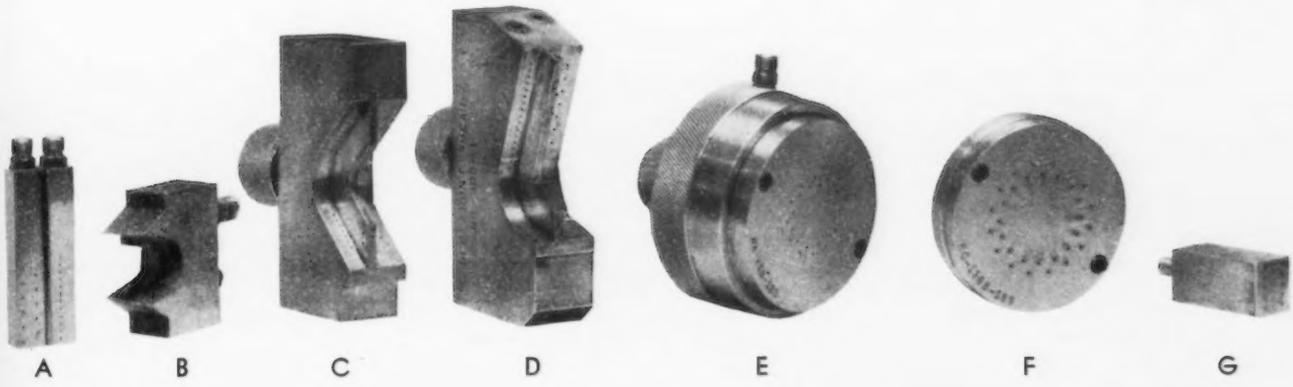
FIG. 33—This series of tests was conducted to show the results of clamping of a long slender piece in a bowed position during the flame hardening operation.

to remove 0.125 in. of stock on each side, it was flame hardened on the opposite side to produce a balanced condition. These parts are regularly flame straightened by hardening the opposite side. After this treatment the strain relieving operation does not cause any change of shape and the average final distortion is within the range of 0.020 in. to 0.025 in.

The foregoing discussion definitely shows that parts of the general design herewith considered must be hardened in such a manner that the stresses are balanced and that a definite advantage is obtained if they are stress relieved.

Special Tips

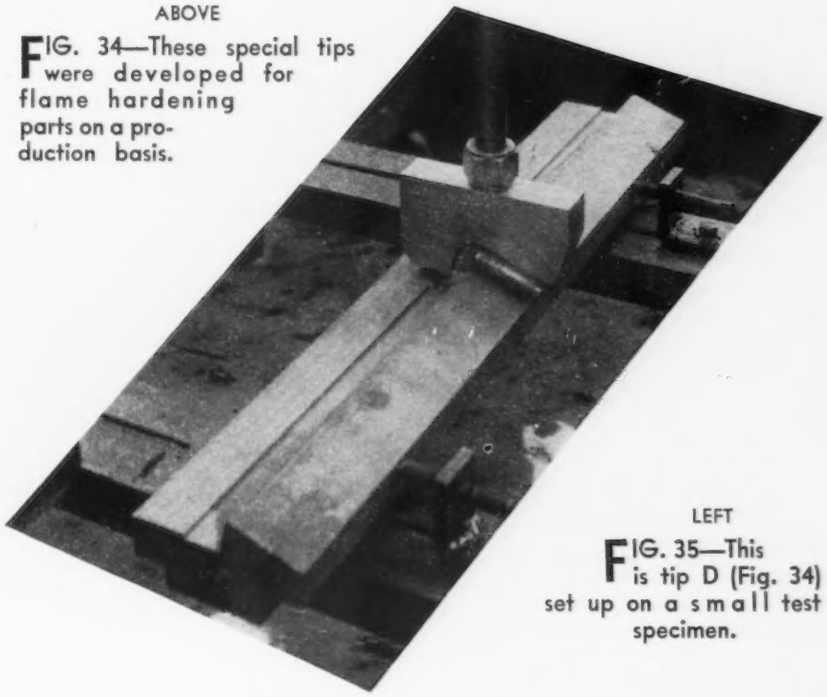
The use of special design tips for parts run on a production basis is frequently advantageous. The photograph shown in Fig. 34 illustrates a few typical examples. The tip "A" as shown in the above figure is of such design



of the same design was clamped in the position as shown in Fig. 33-C. That is, the center was bowed convex 0.125 in., and the part was hardened. When the clamps were released it took the position as shown in Fig. 33-D, that is, it was 0.030 in. concave. It was then placed in a draw furnace and loaded as shown in Fig. 33-E. This allowed the stresses to be relieved, and the part took the form as shown in Fig. 33-F, that is the distortion was equally as bad as that which occurred when it was not clamped. The fact that the distortion of this part increased 0.115 in. when stress relieved under the conditions as shown in Fig. 33-E definitely indicated that if it had been finished without this stress relieving treatment it would have in all probability distorted in service to such an extent that it would have been of no use for a machine tool part. In view of the fact that it would be absolutely impractical, if not entirely impossible, to grind a part of this design

ABOVE

FIG. 34—These special tips were developed for flame hardening parts on a production basis.



LEFT

FIG. 35—This is tip D (Fig. 34) set up on a small test specimen.

that the flame length is very short, thus making it suitable for such parts as shown in Fig. 32. As may be clearly observed in Fig. 32, two surfaces are hardened simultaneously by using these thin tips which are designed to produce a short flame. This tip is also used for hardening keyways and other parts which could not be treated with a standard commercial tip.

The tip B was previously discussed under the heading of gear hardening. The design of this tip must be governed by the pitch of the gear under consideration. However, it is necessary to design the passages in a manner that will produce small flames of uniform length and size. The small fin is very helpful as it prevents the quenching medium from interfering with the flames. It is especially desirable when the tip is used for hardening internal gears, as shown in Fig. 27.

The tips C and D are designed for hardening two surfaces simultaneously. Tips of this type can only be designed after extensive experimental work has been done with two separate units to determine the exact location of the flames for the most satisfactory operating condition. It may be noted that both are equipped with a heavy fin between the flame holes and the water holes. This fin is water cooled to prevent its melting due to the high temperature which is present. The advantage of such a fin is to prevent the quenching medium from interfering with the flames. It also provides a very sharp background so that the operator can more readily observe the surface being hardened. It can be appreciated that the set up time for adjusting a tip of this type is much less than that required for setting two separate tips. Fig. 35 shows the tip D set up on a small test specimen.

The water cooled circular tip E is designed for spot hardening or for use on a flat surface which can be spun or rotated. The line drawing, Fig. 28, illustrates a set-up to harden a small positive tooth clutch. The flame plate F is merely a flat bronze disk which may be turned and threaded in a long bar and any desired pattern of holes can be fabricated to suit the part to be hardened. A tip of this type can be used very extensively for spot or face hardening parts of the same general design as illustrated in Fig. 28. The unit as shown is designed to operate on an Airco 4380 torch.

The tip G is a very simple design and can be successfully used on a small commercial welding torch similar to the Airco 9803. This tip is not water cooled because its use is not recommended for parts that would require a sufficient amount of heat to necessitate that precaution. It should only be used for hardening small parts that require a very few seconds heating time.

There are many other types of special tips which could be designed for various hardening operations. However, they are expensive and should only be used where standard commercial tips will not produce a satisfactory hardening operation economically.

Conclusion

In the foregoing discussion the writer has attempted to point out some of the problems that should be considered when cast iron or steel parts are flame hardened. An attempt was made to prove that flame hardening properly applied will produce satisfactory microstructures in either cast iron or steel. Definite recommendations were made outlining some of the recommended operating conditions for both materials hardened by the progressive method. However, the reader should carefully compare the data tabulated with his specific problem, and a comparison as to set up conditions should be made before following any of these curves or data. The writer would suggest the use of at least some test specimens to be sure that the recommended conditions are satisfactory, because any operation involving as many variables as are encountered in a flame hardening set-up requires very accurate procedure if uniform high standards are to be maintained. It must be remembered that any one or all of the following factors are variable and may cause unsatisfactory results.

(1) Variation of the hole sizes due to improper or careless cleaning methods.

(2) Any variation in the rate of lineal travel. Very unsatisfactory results have been caused due to an unsteady motion produced by vibration in a flimsy traveling mechanism.

(3) The distance of the tip above the work.
- a—The work must be level with the carrying mechanism.
- b—Long slender parts will distort or bow due to expansion caused by the heat, and in certain cases this must be corrected for during the flame hardening operation.

(4) Water Level
- a—Although the water level, that is the level of the water surrounding the work, is not usually of vital importance, there are applications where a slight variation will seriously affect the results. The set-up as shown in Fig. 24 is a typical example of an application where it must be accurately controlled.

(5) Material
- a—It is very important that the material used for flame hardening parts of vital importance should be purchased to controlled specifications if the most uniform results are to be obtained.

As may be observed throughout this discussion all of the operating conditions were based on the use of one type of equipment. Unfortunately this data cannot be applied to some of the other types of equipment. This is due to the fact that there is a basic difference in design of the mixers used by the various manufacturers. Due to this condition operating data which would be entirely satisfactory with the make torch considered in this paper would not work at all if applied on some of the other equipment.

Acknowledgements

The writer wishes to express his appreciation to the following members of the R. K. LeBlond Machine Tool Co. organization for their many constructive criticisms and suggestions: William F. Groene, A. H. Davis, and Floyd Wile. Many helpful suggestions were also made by J. W. Thompson, of Air Reduction Sales Corp. and O. V. Greene, of Carpenter Steel Co.

Rustless Doubles Capacity

° ° °

EIGHT hundred steel executives, stainless steel fabricators, jobbers, distributors, financiers and others interested in the industry were guests of the Rustless Iron & Steel Corp., Nov. 8, in Baltimore, Md., at an open house inspection of a new $2,500,000 addition. This plant is the only manufacturing establishment in the world which is devoted exclusively to the production of stainless steel.

The event marked the completion of an expansion program inaugurated by the management in 1935 and intended for long-range accomplishment but which has been shortened to meet the requirements of a four-fold increase in market demand for the corporation's products.

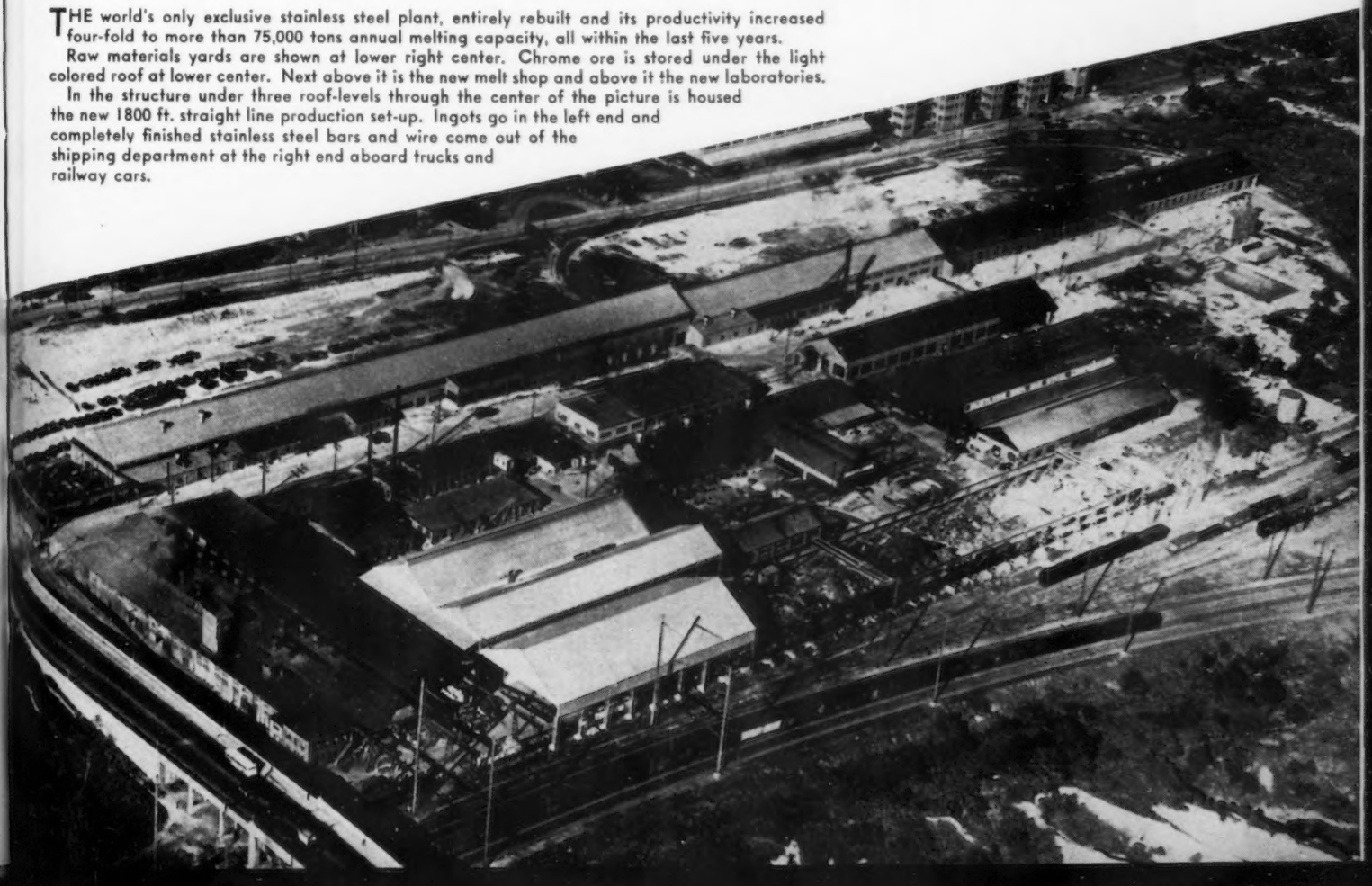
Many of the visitors were guests of officers of the corporation at a dinner at the Belvedere hotel that evening when they heard brief talks which further amplified the significance of the Rustless plant development they had seen during the day. They were told that the annual consumption of stainless steel in the United States is now more than 2½ lb. for each of the 130,000,000 population.

Concerning the completion of this first phase of Rustless' development, C. E. Tuttle, president and chairman of the board of the corporation, said:

"In the history of Rustless we believe that we see a refutation of the defeatist philosophy that no frontiers remain in America. Rather, we believe that we see a true expression of the limitless opportunity that is before us, of the spirit of free enterprise that in the last 100 years has produced the highest standard of living established anywhere in the world."

Mr. Tuttle presided at the dinner. Brief talks were made by Charles R. Hook, president of the American Rolling Mill Co., and Mayor Jackson of Baltimore.

Addresses were delivered by J. H. Van Deventer, editor and president of THE IRON AGE magazine, who discussed the past and future of the stainless industry; and James R. Young, International News Service correspondent who recently won inter-



THE world's only exclusive stainless steel plant, entirely rebuilt and its productivity increased four-fold to more than 75,000 tons annual melting capacity, all within the last five years.

Raw materials yards are shown at lower right center. Chrome ore is stored under the light colored roof at lower center. Next above it is the new melt shop and above it the new laboratories.

In the structure under three roof-levels through the center of the picture is housed the new 1800 ft. straight line production set-up. Ingots go in the left end and completely finished stainless steel bars and wire come out of the shipping department at the right end aboard trucks and railway cars.

national attention with a series of articles exposing conditions in China, which resulted in his arrest and trial by the Japanese. Mr. Young interpreted conditions in the far east in the light of the present situation.

A $1,500,000 plant addition by Rustless in 1937 increased ingot capacity from 20,000 to 40,000 tons a year. This capacity was shortly found to be inadequate, and the current expansion recently completed has increased capacity to 75,000 tons a year. Operations have been stepped up to the point where the number of employees has increased in the past two years from 450 to more than 1400.

The program just completed involved the demolition of practically all former buildings to make way for larger and more modern industrial structures, and the plant has been almost entirely equipped with new machinery.

This first chapter of Rustless' industrial growth has been written entirely within the last ten depression years.

Visitors at the open house inspection saw the evidence of this development in a day-long series of tours through the plant. They visited every department where they had an opportunity to see the Rustless process of stainless steel manufacture in operation. They saw the methods of laboratory control to insure standard quality. And they learned of typical applications of stainless steel in practically every industry including aviation, automotive, railroad, screw machine, chemical, oil refinery, heating and ventilation, laundry, dairy, food, mining, beverage, textile, paper, electrical, shipbuilding and numerous other industries requiring a metal with unstainable properties, great strength and a high degree of resistance to heat and corrosion.

Rustless is believed to be the first company in the stainless steel industry to adopt the same straight line system of production which is to be found among the automotive makers. Each of the corporation's products passes in a straight flow of manufacture through its own separate channel of plant operation, thus eliminating superfluous movements of men and materials. From ingot heating to shipping department bars and wire are produced within a single 1800-ft. building.

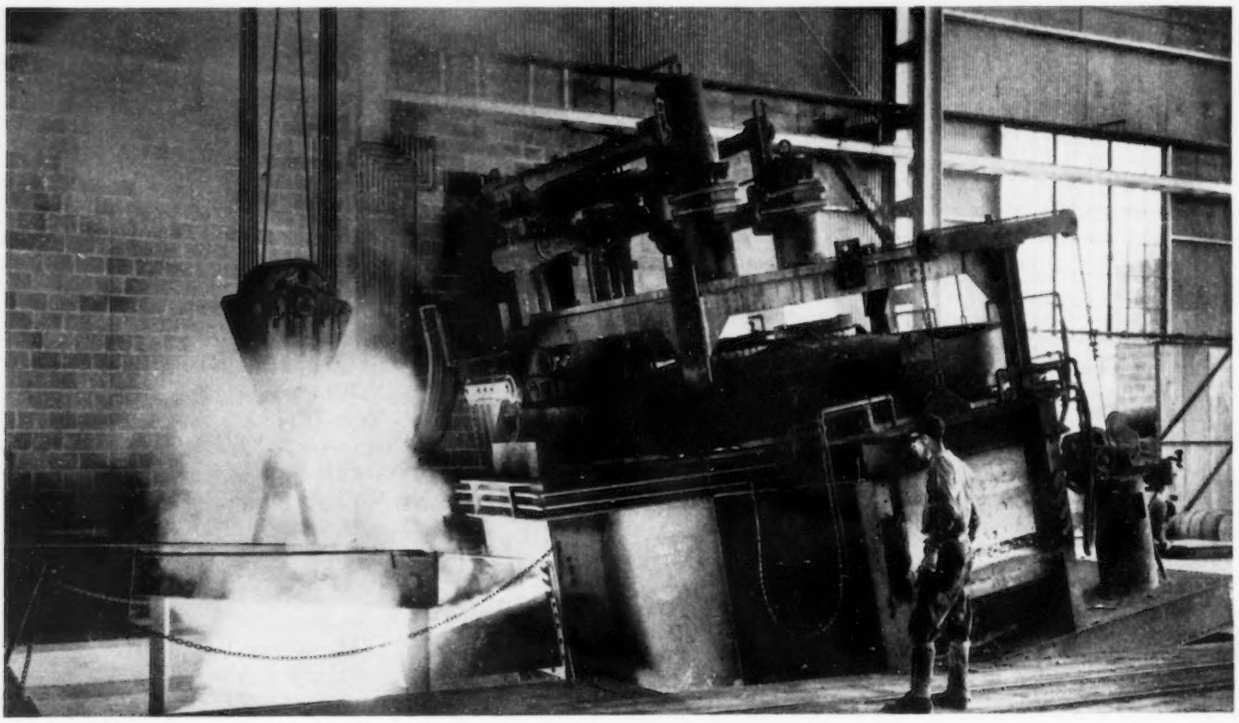
In the Rustless straight line production system ingots first pass through a rolling mill where they are converted into billets. After being conditioned they are hot rolled into bars and wire. These hot rolled products then are annealed and pickled according to the specifications of individual customers. Stock which is to be cold finished is conditioned and then cold drawn or centerless ground. After a final rigid inspection the bars and wire are made ready for shipment.

When the management initiated its long-range expansion program in 1935 the corporation's principal producing equipment consisted of three 6-ton electric furnaces, a 20-in. rolling mill and a 5-stand, 9-in. bar and rod mill. In that year the company had a melting capacity of 20,000 tons of ingots.

Melting facilities were changed in 1935 from the original three 6-ton furnaces to three of 12 tons each. Two 16-ton furnaces were added in 1940 which increased the annual melting capacity to 75,000 tons, nearly four times the capacity of five years ago and almost twice the capacity of 1937.

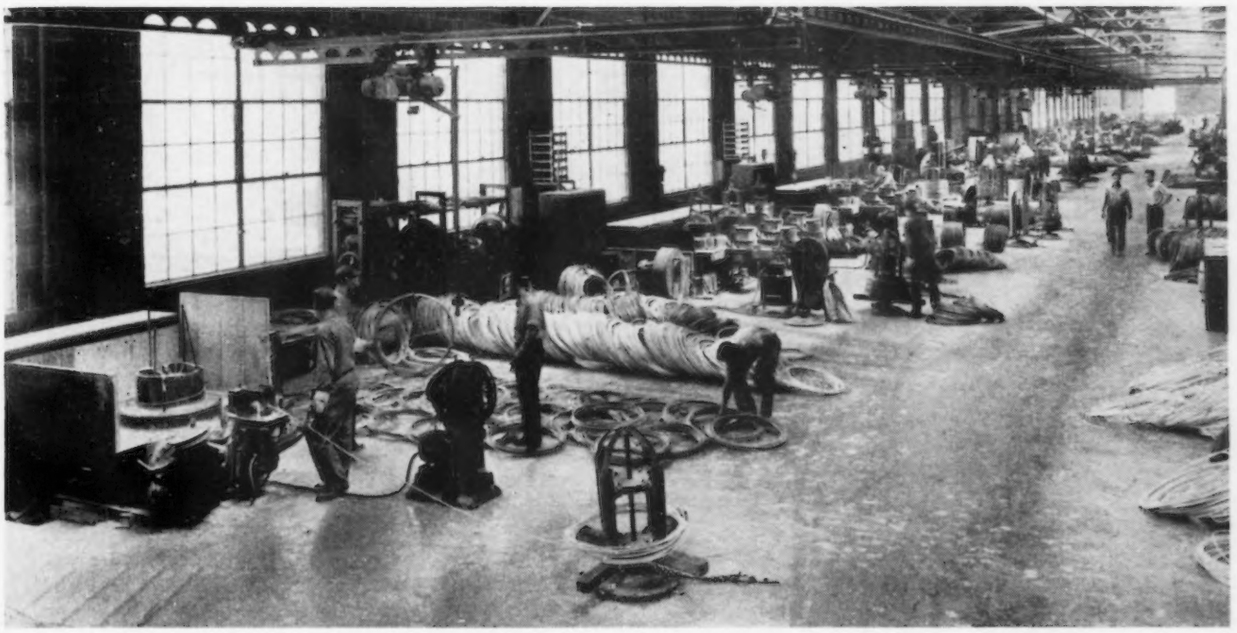
To the 20-in. and 9-in. mills which the corporation had in 1935 was added a 12-in. bar mill in 1937. A 28-in. mill has been added in 1940 to produce billets, sheet bars and slabs, as well as a 3-stand, 12-in. mill and a 7-stand, 9-in. mill for the production of bars or coils.

Equipment added to the cold finishing department has more than doubled production, not including a new cold roll mill for the production of special bar and wire shapes to meet present-day conditions and customer requirements. Finished bar and wire capacity is now about 1500 tons a month, be-



TAPPING one of the five electric furnaces in the new Rustless melt shop. Their aggregate melting capacity is now 75,000 tons a year.

o o o



WIRE stock is drawn through dies in the cold finishing department. This operation provides close control of size, improves physical properties and gives the surface of the wire a mirror-like finish.

tween four and five times the capacity in 1935. Other operations have been increased proportionately.

The Rustless method of stainless steel manufacture employs melting and other processes covered by patents or applications for patents which have been developed by the corporation's own chemical and metallurgical engineers. The exclusive melting processes permit the direct reduction from chrome ore of the chromium which gives the stainless steel its principal inherent qualities. Rustless also has pioneered in the development and use of chrome ore produced from deposits in the United States and has been the sole user of domestic chromite for a number of years.

The corporation's products are sold in the form of billets, bars and wire to industrial users, jobbers, and distributors and in the form of ingots, blooms, slabs, billets and sheet bars to converting mills for further processing into sheets, strip and plates.

Officers of the Rustless Iron & Steel Corp are: C. E. Tuttle, president and chairman of the board of directors; T. F. McLaughlin, vice-president; M. K. Schnurr, secretary and treasurer; and M. J. Caden, comptroller.

Directors are: C. E. Tuttle, chairman, Bruce Borland, Charles R. Hook, C. S. Payson, J. A. W. Iglehart, W. W. Sebald and Calvin Verity.

THE cold finishing department where hot rolled annealed bars are cold drawn to secure close dimension tolerances, and to improve surface finish and physical properties. When an even higher surface finish is required a large battery of grinders and polishers in the same department is brought into use.

Welded Joints Analyzed By Polarized Light

ABSTRACTED from a paper delivered before the annual meeting of the American Welding Society at Cleveland, Oct. 24. Polarized light cannot be passed through metal, of course, but when passed through celluloid models simulating the conditions of welded joints, points of stress concentration due to faulty design or welding procedure are revealed.

By E. W. P. SMITH
Consulting Engineer, Lincoln Electric Co.

UNIFORMITY of stress distribution is much to be desired in any type of engineering design from the point of view of economic use of material. In general, the peak or top stress is the governing factor in determining load capacity of any unit. If the stress be more uniformly distributed, more load may be carried and a reduction of cost per unit of performance obtained.

To study stress distribution in welded joints, a number of methods are available. Where the problem is two dimensional, the solution may be obtained relatively quickly and easily and within an accuracy in line with the refinements of the design by means of a study of a stressed model of suitable transparent material placed in a beam of polarized light. Two joints may be placed on the same model and a comparison made. The joint that shows the higher stress is rejected. The model retained is modified, then compared with a third model and the process repeated until a satisfactory low cost answer results.

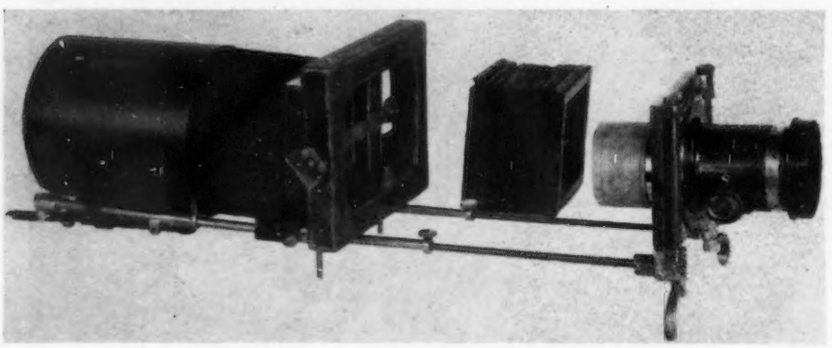


FIG. 1—Slide projector modified to pass polarized light through a transparent model so that the stress patterns under load may be examined on a screen. The slide holder contains polaroid film and a similar film with polarization axis at 90 deg. to the former is placed in back of the objective lens at the front of the projector. Frame in which the model is loaded in tension is placed in front of the slide holder.

Models may be made of materials such as glass, celluloid and bakelite which normally have equal properties in all directions when stressed. Using a modified slide projector, Fig. 1, and a pair of inexpensive polarizers between which the model is inserted, the fluctuation of stress concentrations may be examined on the screen while the model is loaded in tension in a suitable frame. Comparisons of different designs are thus readily made by studying patterns of models of these designs and making comparisons. Stress concentrations are noted wherever there is marked crowding together or abrupt curving of the bands. It is usually evident what changes should be made. The designer might well think of the distribution of stress as similar to the flow of water. Uniformity of stress to as great a degree as possible and thus

low cost of product is to be obtained by gradual changes in section, omission of irregularities, external and internal, just as turbulence or splash is avoided in a flume.

In welding, excess metal should be kept to a minimum. In Fig. 2, it is evident that excess reinforcement on a butt joint is serving no useful purpose as a load carrying member and it is very costly. At $1 a lb. for deposited weld metal, a double U-joint with 25 per cent reinforcement or 12½ per cent on a side would weigh 0.391 lb. per ft., for example, and would cost $0.39 per ft. respectively. Similarly, costs may be reduced in fillet welds by keeping excess metal to a minimum.

Any interference with stress causes a disturbance with resultant impairment of performance. Poor workmanship, for example, may result in undercutting of a welded joint, as in Fig. 3. The crowding together of lines and quick change of direction show effect of undercutting. Correct procedure improves the use of metal for better performance of product. Another example of the same general kind is a single V with lack of fusion at the root, Fig. 4. Lack of fusion at the bottom of a single V shows failure to fuse the bead completely to the sides and bottom of the V and results in a notch effect. The crowding together of lines and quick change of direction indicate high stresses and poor use of material. In the case of a square groove butt joint in which there is lack of fusion in the middle (welding being done from both sides) an internal notch effect is created that is just as detrimental as the case previously cited.

A lap joint is another place where the combination of direct tension and bending resulting from eccentric loading results in high local stresses. Analysis of such joint samples under polarized light will reveal just how far a designer can go in reinforcing a weld of this type and where he will run into waste metal that will carry no useful load. Metal put in the wrong place is a dead loss. A butt strap, for instance, is no help in increasing performance and under certain conditions causes actual reduction in performance. It carries very little stress, makes an eccentric loading of the joint and in general should be avoided.

Welding in combination with riveting is poor practice, models examined under polarized light show. Usually stresses concentrate at the weld, leaving the rivets little load to carry. If both ends of the lap are welded, the rivets do no work.

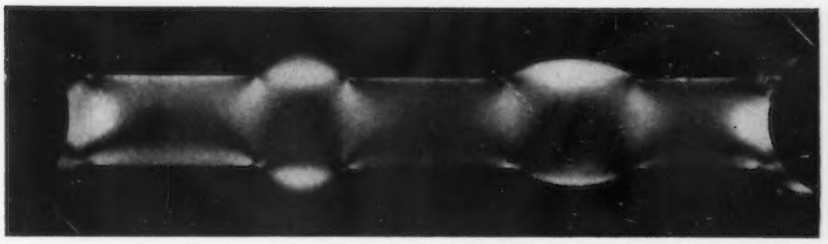


FIG. 2—This celluloid model of two reinforced butt welded joints under polarized light shows that excess reinforcement carries no useful load and therefore is extremely wasteful.

FIG. 3—The crowding together of stress lines under polarized light and quick change of direction show what stress concentrations occur when poor procedure is employed and a V weld is undercut.

FIG. 4—Direct tension plus bending results in very high localized stresses due to notch effect produced by lack of fusion at the bottom of a single V weld.

Air Conditioning Saves Knives

RUST, the annual summer plague of manufacturers maintaining stocks of expensive metal parts, has been eliminated as a loss factor by the Imperial Knife Co., Providence, R. I., through an air conditioning installation in the stock room.

Because several million pocket knives are kept in stock, the company suffered substantial losses each summer when moisture condensed out of the air and rusted the highly polished knife blades. Last year executives of the firm ordered two G-E (3 hp.) unit air conditioners, and after a full year's operation, they report that the rust problem has been completely eliminated, and summer comfort provided for stock room employees.

A unique feature of the installation is the occasional use of a heating coil, in summer. This re-heat coil operates to prevent over-cooling when the refrigerating machine has a heavy dehumidification load but a light cooling load, as on "cool, clammy" days.

The units are compact, and require very little floor space, one being installed on each side of the entrance. It is estimated that the cost of the installation has been more than paid for by the prevention of one day's potential rust loss.

Sam Carbis Had An Idea

SAM H. CARBIS, president of the Aluminum Ladder Co., on the lightest aluminum ladder he manufactures. This ladder only weighs 1/2 lb. per ft.

o o o

THE story of Sam Carbis and the Aluminum Ladder Co. is a story of a little business, born in the depression, which established a new frontier in the heart of a great industrial region at a time when ordinary initiative was stagnating.

Sam Carbis, who keeps a score of men busy making nothing but aluminum ladders, stages, and gangways, never even gave a thought to such products in the lush days when he worked in the machine shop of the Aluminum Co. of America's New Kensington, Pa., plant. However, New Kensington machinists had little to do when the depression got under way in 1930.

Company management encouraged the machinists to turn out bobsleds, bicycles, outboard motor parts, drum sticks, baseball bats, billiard cues, shut-off nozzles for fire companies, quick-acting wrenches for fire plugs, and the like. They even made a fire ladder, and donated it to Edward Clawson, New Kensington fire chief.

Clawson was delighted with it. So were other fire chiefs. So were Aluminum Co. executives, who felt that the aluminum ladder had a future. This ladder was light and strong, it wouldn't catch fire, and had a number of other advantages over the conventional fire ladder.

The Aluminum Co. then approached a large manufacturer of fire ladders, with the intention of interesting him sufficiently in the new product so that he would spend some time and effort in developing the aluminum ladder. But this manufacturer was definitely not interested.

Other ladder firms were approached, with the same result. By this time enough fire chiefs had seen the New Kensington ladder to sustain the original interest created by Chief Clawson's ladder, and requests for additional ladders began to come in.

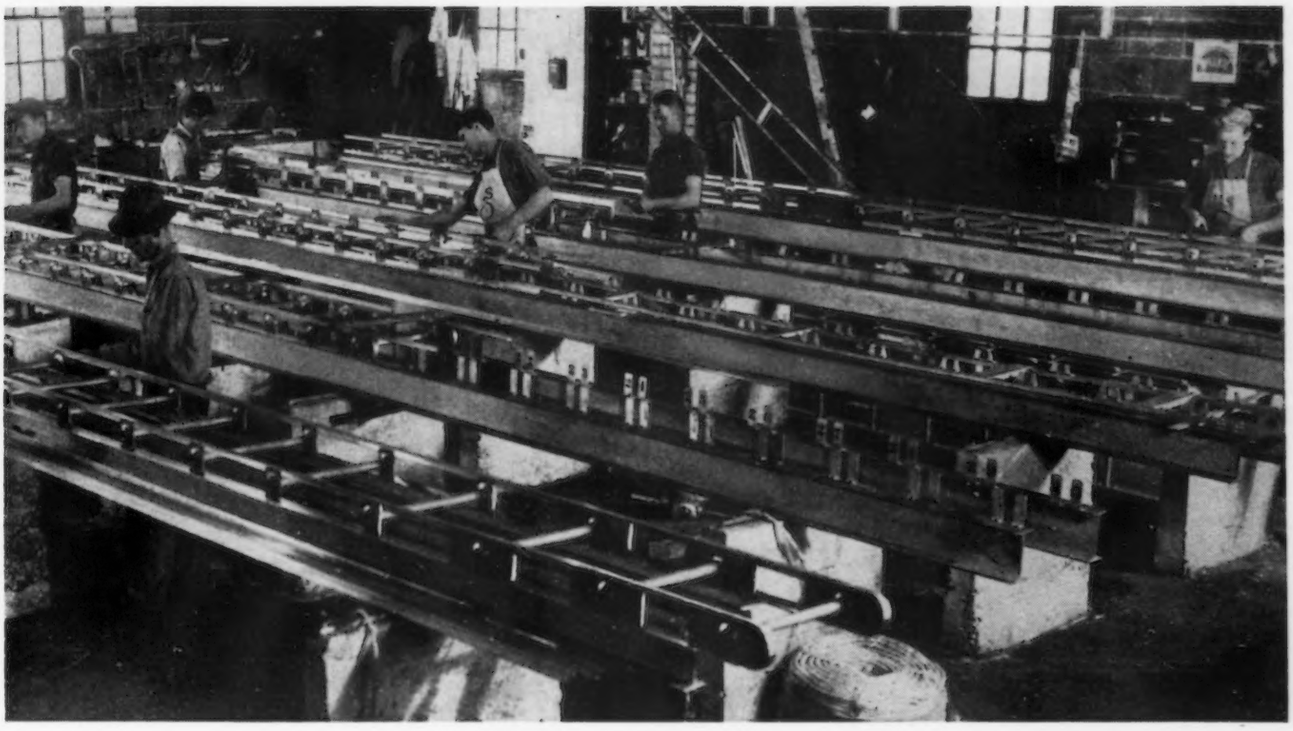
Sam Carbis decided to make these at home. Soon he had so much work that he couldn't do it all in his spare time. He hired a man to work for him, and the Carbis car stood exposed to the elements for several years while aluminum ladders were being made in the family garage.

In 1935, Sam Carbis sold $8,000 worth of ladders. In the following year he doubled his business, and now, he felt, it was getting to the point where it ought to have a corporate entity. In November, 1936, the Aluminum Ladder Co. obtained a Pennsylvania charter. Its shop was located in Tarentum, a few blocks from Sam's house, and across the river from the New Kensington plant of the Aluminum Co.

Sam soon found that the new venture took more of his time than he could spare. Accordingly, he gave up his position with the Aluminum Co., and went entirely on his own. He hired three men to do the shop work, and his daughter Helen became both typist and bookkeeper.

That was three years ago. Now, in 1940, the company is in a new building, there are 15 men in the shop, two draftsmen in the office, and the management includes the following: Sam H. Carbis, president and general manager; E. A. McCarthy, secretary, and J. G. Campbell, treasurer. Even the new building may soon be too small for the orders that are crowding the place to capacity.

Business has been booming. Total



GENERAL view of the shop of the Aluminum Ladder Co. showing a row of ladders during fabrication. They are mounted on concrete horses about 4 ft. from the ground and thus can be easily worked at by the shop employees.

sales in 1937 were $22,000. The next year they jumped to $34,000, and last year they were $65,000. Sam expects to sell between $90,000 and $100,000 worth of ladders in 1940. He likes to clear between 10 and 11 per cent on an order, and usually uses these profits to buy more stock, thus always having ample material on hand for the anticipated orders.

Only once did he have to go to the bank to borrow money. That was a few weeks ago, when prospects looked so bright that he wanted to make sure he would have supplies in the stock room when these orders came through. He got the money without a hitch, and, with business being what it is for him, he expects to liquidate this obligation in less than a year.

The Aluminum Ladder Co. has 39 sales agents in the United States. In addition, foreign agents include representatives in Canada, Cuba, Venezuela, Argentina, Colombia, Brazil, Peru, Uruguay, and the Philippine Islands. Aluminum ladders have been shipped east as far as Persia, south as far as the Argentine, west as far as the Philippines, and north as far as Alaska. Many of them are fire ladders, but others are used in industrial applications.

That the aluminum ladder should have such success proves only one thing: manufacturers were overlooking a good bet years before Sam Carbis came along. It's no trick to build up a business from nothing like Sam Carbis did. All you have to have is an idea!

Brass Plating at High Speed

A NEW brass plating process, said to be two to four times as fast as present processes, has been announced by the electroplating division of E. I. du Pont de Nemours & Co. The process has been developed to provide a brass plating method which will yield smooth bright deposits of controllable thicknesses at a rapid rate of deposition.

The process makes possible heavy deposits of brass, 0.001 in. or more in thickness, in a reasonable time where before heavy deposits could not be obtained at all.

Prepared high speed brass salts is said to provide a simple, quick preparation of a new bath, which will plate immediately, eliminating any "breaking in" period necessary before satisfactory results are obtained with the present processes.

The process operates without polarization at high anode current densities, giving proper composition and color of plate and the purity necessary to maintain the efficient operation of the bath. Addition agents prevent pitting, improve luster and prevent objectionable fumes.

The relatively low temperature of operation, 40 deg. to 50 deg. C. (105 deg. to 125 deg. F.), assures ease of control and economical operation. A uniform bright yellow color may be obtained over a wide range of current densities. This means that uniform color over recessed objects is possible.

Carbide Tool Prices

—Economic consequences of the recent reductions

By PHILIP M. McKENNA

A MILESTONE on the road of American industrial history was passed a few weeks past when leading manufacturers of cemented carbide tools reduced prices from a schedule based on 45 per gm. to one based on 10 per gm. for the hard carbide blanks. At the same time prices of the complete tools of standard styles for turning, boring and facing were also greatly reduced. These standard tools for lathes, boring mills, turret lathes, shapers and planers cover 80 per cent of single point tool requirements. The lower cost of supplying standard tools, rather than tools to specifications, is reflected in the lower prices. The exact shape to suit the need to do any particular job may be obtained by grinding the point of a tool selected from 20 styles and 24 shank sizes. Non-standard tools to drawings are also lower, due to the reduction in cost of the carbide tips.

The advantages of carbide tools are becoming so well known that all that was needed to establish their universal acceptance as an aid to production was a commercially acceptable first cost. A carbide tipped tool ¾ in. square and 4 in. long with tip 3/16 x 7/16 x ⅝ in. costs $2.43 in lots of 25 or more under the new schedule. It is rough ground. Previously these tools had cost the user $5.99 each, unground in this quantity. A tool 1¼ in. square and 9 in. long with tip 5/16 x ½ x ⅞ in. now costs $6.11 in lots of 10 or more and previously cost the user $15, unground. A piece of high speed steel 1¼ in. square x 9 in. long weighs about 4½ lb. and requires forging, heat treating and grinding to prepare it for use.

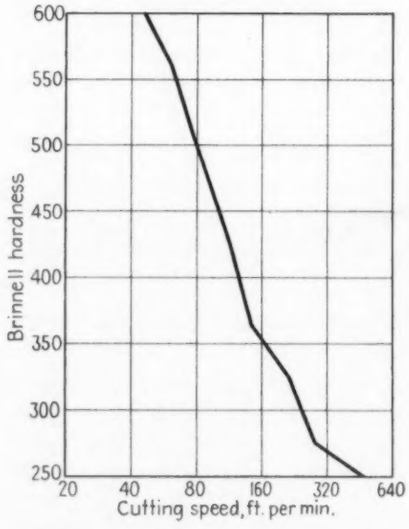


FIG. 1—Machining speeds with Kennametal on commercial steels, such as SAE 1045, 3140 and 4320. Graphed on semi-logarithmic scale.

Its cost is not far from that of the carbide tool. In a recent article in THE IRON AGE ("Steel Gear Blanks Cut With Carbides," Sept. 5, 1940, page 25) the number of steel rings of 0.40 to 0.50 carbon steel, heat-treated to a Brinell hardness of 350, from which 218 cu. in. of metal are removed in turning was 15 per tool for high speed steel and 85 for the steel-cutting carbide tool. Without reckoning the savings of 50 per cent in cutting time, the carbide tool costs one-fifth as much per ring turned out, at the new low prices of carbide tools.

From the standpoint of national economy of tungsten, which is largely imported, the high speed steel tool weighing 4½ lb. and containing 18 per cent tungsten required 0.81 lb. of tungsten. Since 5⅔ such tools are required to do the work of one carbide tool, 4.6 lb. of tungsten are needed when used in high speed steel. The carbide tool tip of the size used (S-255, 5/16 x ½ x ⅞ in.) is calculated as weighing about 32 gm. or only 0.07 lb. Thus less than 1/60th as much tungsten is consumed when carbide tools are used on this typical job. This is because the expensive ingredient is mobilized or concentrated at the cutting point which does the work.

Germany has recognized the economic value to national economy of

cemented carbide tools for a number of years. For reasons of self sufficiency carbide tools have been compulsory there. The following quotation from Karl Becker's *Hartmetallwerkzenge* (hard metal tools) is typical.

"From the standpoint of national economy hard alloys compare very favorably with high speed steels in the quantities of raw materials required, which are scarce in domestic (German) production, as for example the costly tungsten ore. For a summary of the situation we must consider the most unfavorable case, and a more favorable case. A masonry drill with hard alloy points 20 mm. thick does the work of eight high speed steel drills of equal diameter. The hard alloy tips weigh about 13 gm., while the high speed steel drill weighs 300 gm. In high speed drills containing 4 per cent tungsten for this application the drill contains about 12 gm. of tungsten. For eight such drills 96 gm. of tungsten would be necessary, while for the hard alloy drill only about 12 gm. of tungsten is required. According to this calculation, the consumption of tungsten based on equivalent performance is eight times as much for high speed steel.

"The application considered above for masonry drill, is not representative of the majority of work, which is metal cutting. Usually here in metal cutting, the production of hard alloys finds its singularly useful applications. It is not far wrong to say that 70 per cent of the production is for these uses. In the field of metal working the favorable ratio of comparison is further shoved up. One can estimate that referring to equal performance, 1 kg. of hard alloy replaces 100 kg. of high speed steel. In this regard high speed steel of about 20 per cent tungsten is considered. Thus 1 kg. of tungsten in hard alloys serves for 22 kg. in high speed steel. Also the way in which the hard alloy cuts is more favorable when regard is had to the sort of work metal which may be machined."

The article goes to on point out the economies in hard carbide tipped milling cutters, and multiple-point tools, as well as in lathe and boring tools.

Since Becker wrote this, in 1934, invention and research in America have resulted in the discovery of tungsten-titanium carbide, $WTiC_2$, in single phase crystalline form. The American hard alloys have greatly increased the scope of usefulness of hard cemented carbide, by making the same economies in machining steel that were then

o o o

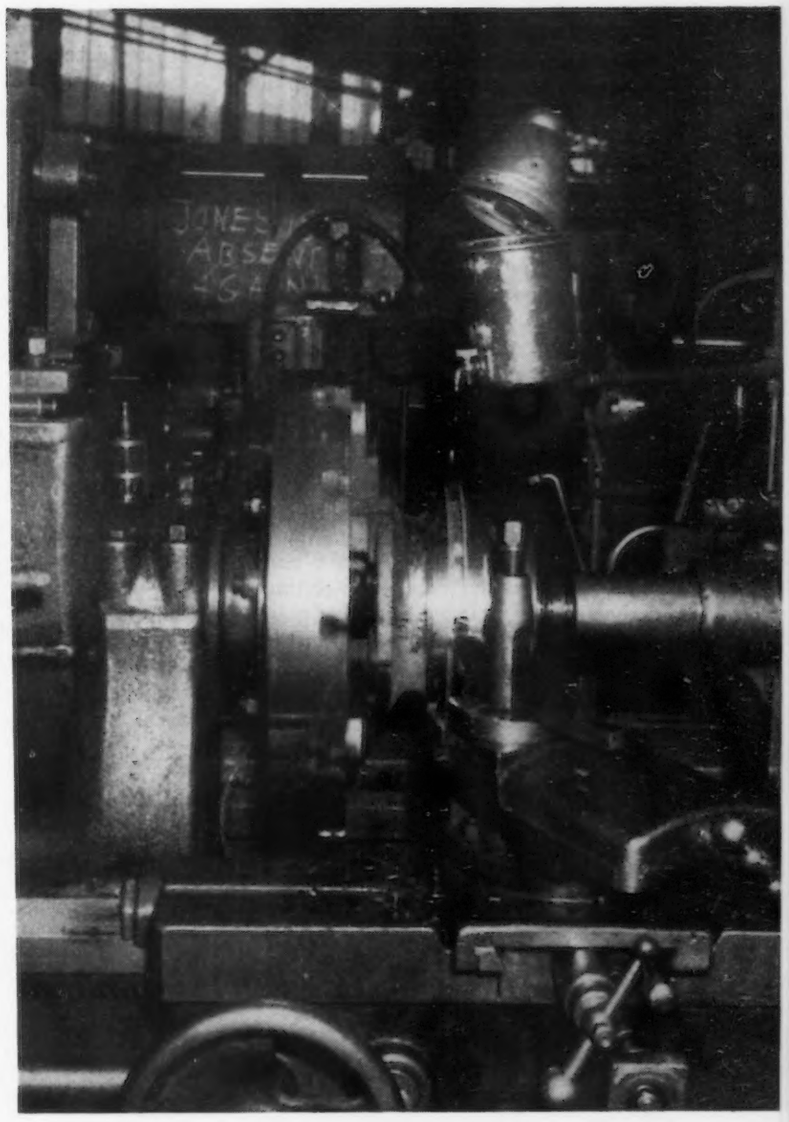


FIG. 2—Grooving a 0.40 C steel casting with a carbide tool. Diameter of work, 11½ in.; groove width ½ in.; feed per revolution 0.020 in.; cutting speed 57 r.p.m., 170 ft. per min.

o o o

o o o

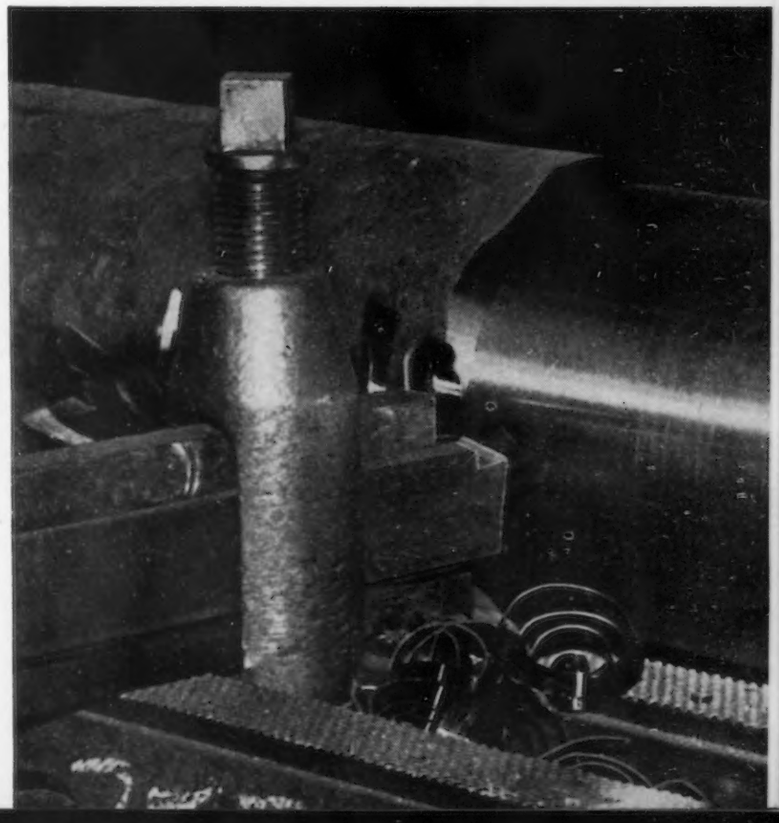


FIG. 3—Turning operation with a carbide tool on a rough forging 8 in. in diameter, of SAE 3120 steel, 320 Brinell. The speed is 150 ft. per min., feed 1/16 in., and depth ⅛ to ¾ in.

o o o

possible with tungsten carbide for machining cast iron and metals of low tensile strength. Great strength and high hardness characterized the use of the new ingredient, tungsten-titanium carbide ($WTiC_2$) synthesized under a nickel menstruum. This compound is cemented with cobalt into fine-grained crater-resistant tool tips, by processes of vacuum metallurgy.

Tough alloy steels, often heat treated as high as 500 Brinell in aircraft parts, are machined with the new alloys at three to six times the speed possible with high speed steel tools. Automobile axles, driveshafts, gun barrels, torpedo tubes, stainless steel castings, gear blanks, and chromium steel ball races are examples of work being done with these tools.

Shell turning is being done on a vast scale, both in North America and in England with these steel-cutting carbide tools. It is a truism that governments start to fight a war on the basis of knowledge obtained in previous wars. They can do little else. Yet the material basis in the meantime has been altered by discoveries not yet widely enough known. However, among readers of THE IRON AGE a more accurate appraisal of the situation should be possible.

Can America produce all the armament needed at this time and still maintain her high standards of living? Those standards require the use of machinery in our daily lives to a greater extent than any other people. This machinery is made by cutting it from forgings and castings with metal-cutting tools. The speed and accuracy of manufacture of these parts determine the standard of living. The cemented carbide tool will conservatively reduce these costs by 30 per cent, when widely used. It may be a trite remark, but its truth justifies saying that the historian classifies man, the only tool making and tool using animal, according to the kind of tool material he uses. Is the cemented carbide tool age to be added to the stone age, the bronze age, the iron age, the alloy steel age as a student of industrial history in 1960 looks back?

Carbide tool metals have been aptly phrased "vitamins of industry." Tiny grams make healthy tons of production. It is therefore important that the ultimate in strength, hardness and crater resistance of the tool tip be obtained. American metallurgists have spent thousands of dollars to provide this ultimate strength and hardness for cutting tools.

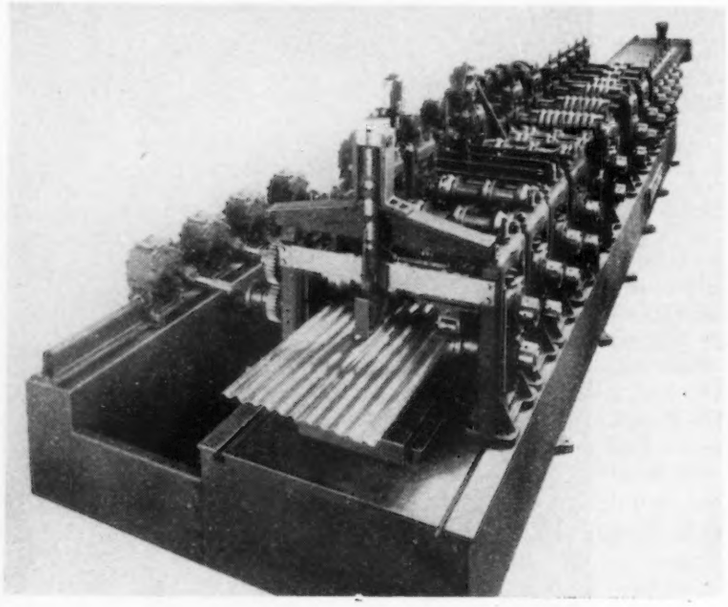
Will American industry respond by their rapid adoption on a wide scale, at the new low prices? They are already doing so, and the volume of carbide tips requisitioned increases monthly. No other single factor will increase the industrial and military potency of our country so rapidly as the widespread use of cemented carbide tools in shops large and small. In fact it is more profitable to use carbide tools on jobbing work, usually performed with single point lathe or boring tools, on engine lathes and boring mills where the cost is determined by the rate at which the tool may traverse the job without failure of the point, than on multiple tooled mass production jobs.

A comparison of the range of cutting speeds of steels of all ranges of hardness is shown in Fig. 1. Photographs of steel turning operations are shown in Figs. 2 and 3.

Corrugated Iron Porcelain Enameled

THE widespread application of porcelain enameled iron has recently been extended to roofing and siding with the development of an interlocking corrugated sheet porcelain enameled on both sides, combining the corrosive-resisting qualities of porcelain enamel and the strength and fire resisting qualities of steel.

Created by Porcelain Steels, Inc., Cleveland, under the name of Por-Ce-Lok, it provides a different and decidedly durable building material for roofing and siding. To fabricate this new product, a special cold roll forming machine was designed by Kane & Roach, Inc., Syracuse (see illustration). Taking sheets of 20 to 26 U. S. Standard gage enameling iron, 32 in. wide and from 5 to 10 ft. long, it delivers them at the rate of 120 ft. per min. During the forming process, a 32-in. sheet loses 8 in. in width.



In laboratory tests the double-coated porcelain enameled sheets were subjected to 565 hr. of fog and salt water and 16,800 hr. exposure to the Weatherometer, ultra-violet rays and heat. At the end of this test, the equivalent of many years, there was no indication of coating failure.

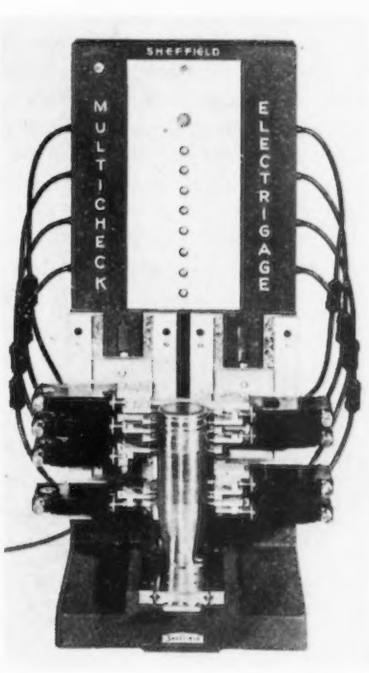
With its interlocking flange, Por-Ce-Lok is easily assembled. The prepunched holes are protected by porcelain enamel, while straps, clips, bolts, and sheet metal screws are supplied galvanized, sherardized, or cadmium plated. There are no exposed holes and all attachments are concealed. Por-Ce-Lok is available in royal blue, forest green, maroon, and fall brown.

New Equipment . . .

Gages, small tools and accessories:

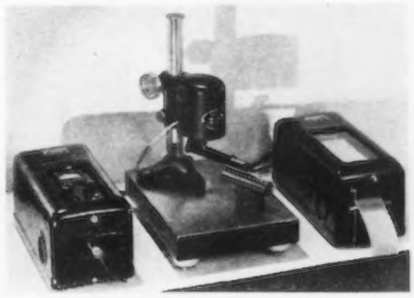
New and improved instruments for measurement of surface smoothness, size, hardness, tube interiors, etc., hand tools and other machine shop auxiliaries are described herein.

A PRECISION instrument for the rapid inspection of mass production parts having several critical dimensions, as for instance the several diameters and shoulder lengths of an armature shaft, has been introduced by *Sheffield Gage Corp.*, Dayton, Ohio. Called the Multicheck Electrigage, this instrument is finding use in inspecting timing fuse elements, shell bodies, cartridge cases and other ordnance work. Measurements of length, diameter and depth are flashed simultaneously on a control board by means of colored signal lights. An individual gaging head is incorporated for each dimension to be checked, and each head actuates a signal light. When a signal light shows amber, it signifies the gaged diameter is within tolerance. Red indicates undersize and green oversize. There is also a master signal light which integrates all measurements. A plan of the work part is shown, and this plan indicates each dimension with its own signal light. It is claimed that one operator can check dimensions on a 75-mm. shell at rate of 600 per hr. Gage can be used on large parts and parts as small as ⅛ in. long and 3/ 32 in. in diameter. The Sheffield reed mechanism, featuring positive action and absence of frictional losses, is used in each Electrigage head.



Surface Analyzer

SEVERAL notable improvements have been incorporated in the new model SA-2 surface analyzer manufactured by *Brush Development Co.*, 3311 Perkins Avenue, Cleveland. The drive head has been changed to provide 0.06 in. traverse over the specimen surface, in place of 0.05 in. as heretofore. Time for a complete cycle



of trace has been reduced from 15 to 10 sec. The new drive head produces a constant velocity motion over about 95 per cent of the trace, as compared with the harmonic travel of the previous model. A self-contained synchronous motor operates the new head in place of the flexible shaft previously employed. The stylus in the pickup arm has been placed ahead of the positioning shoe and the top of the advance finger is beveled so that it is possible to get almost to the root of gear teeth and shoulders. A rack and pinion have been added to the drive unit to facilitate vertical adjustment of the drive head. Range of vertical travel has also been increased, eliminating the V-block. Operation of the complete circuit has been simplified by centralizing all equipment control in one switch after the initial setup. A double pull, double throw switch cuts off the oscillograph as well as the paper drive motor to prevent possible damage to the pen while changing samples.

Profilometer Accessories

TWO new accessories for the Profilometer, surface roughness measuring instrument, have been developed by *Physicists Research Co.*, 343 South Main Street, Ann Arbor,

Mich., which greatly extend the usefulness of the instrument. One accessory, called the Mototrace, provides mechanical operation of the tracer as it moves over the surface to be measured. Mototrace finds special use when the tracer is on very narrow surfaces or small areas where available tracing distance is only 1/32 to ⅛ in. It is also useful in awkward places near shoulders and holes, and on very smooth surfaces (1/3 to 2 microinches) where extraneous vibration makes manual tracing difficult. It can also be used in small holes. Two motions are provided, one a constant speed linear movement, automatically reversing at both ends, the second is a cam-driven constant speed, quick reversal reciprocating motion, adjustable from 1/64 to ⅛ in. The second new

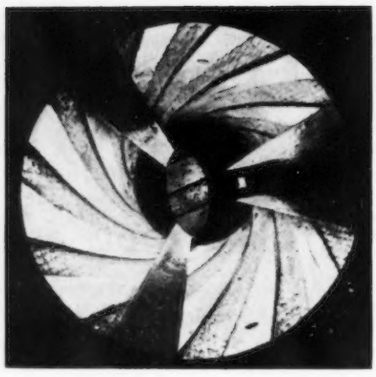
accessory, Type 1 Tracer, is for measuring roughness inside holes as small as ½ in. diameter. It is also useful for measuring gear teeth and other hard-to-reach surfaces. The company is also manufacturing a new model Profilometer with a 1 microinch scale for especially fine work, as on gages, etc.

Vibration Measurement

AN instrument for the electronic measurement of vibration, called the Vibrometer, is being marketed by *Televiso Products, Inc.*, 2400 North Sheffield Boulevard, Chicago. Direct reading from 0.00001 to 1 in. in four ranges, the Vibrometer finds wide application in production checking of stress and strain in castings, determining maximum rate of reciprocation before fracture occurs, dynamic balancing of fans, determining optimum rate of acceleration in reciprocation, checking of gear train clash and determining periodic moments of stress. It is said to give fast and accurate readings with absolute uniformity of repeat checks. A 9-in. meter indicates exact amplitude of vibrations regardless of frequency or prod pressure and is not affected by noise or extraneous agitations. Accuracy is said to be 3 per cent on all ranges.

Bore and Tube Inspection

VISUAL examination of bores, tubes and other recesses inaccessible to the eye, including gun barrels, is possible with the inspection telescope developed by *Gaertner Scientific Corp.*, 1201 Wrightwood Avenue, Chicago. Accompanying photograph shows the field of view of this instrument. The telescope provides a clear, detailed enlarged interior view in bores up to 20½ ft. long and 1 to 4 in. in diameter. Main unit consists of an illuminating head, a telescope tube containing required optics and a removable eye piece. Main tube is 4½ ft. long and up to four 4-ft. extensions can be added. Adjustable inclined mirror gives a view along the bore walls and also may be arranged to give a direct view at right angles to wall. The image of the wall appears on the mirror in the center of the field of view, as shown in the illustration.

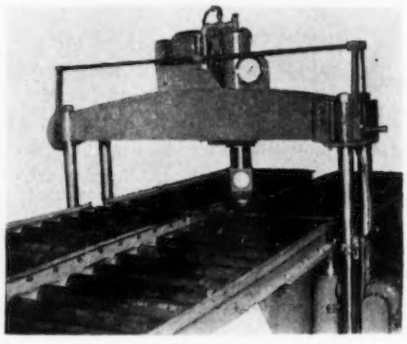


Hob Checking Fixture

DESIGNED for routine checking of hobs after sharpening, the new fixture announced by *Michigan Tool Co.*, Detroit, is universal in character and has a maximum capacity of 12 in. diameter and 15 in. between centers. Fixture will check hobs for radial sharpening, spacing of flutes and runout of hobs. It can also be used for checking single form relieved cutters or form gashing cutters for sharpening and spacing. Dial indicator can be moved in both horizontal and vertical planes, while head carrying the indicator can be moved parallel to the centers for checking at either end of a long hob. Indicator's up-and-down movement is through a micrometer barrel having a graduated dial. Inaccuracies in readings due to play at the centers are avoided by mounting index plate on arbor, permitting the centers to be made solid.

Plate Brinell Tester

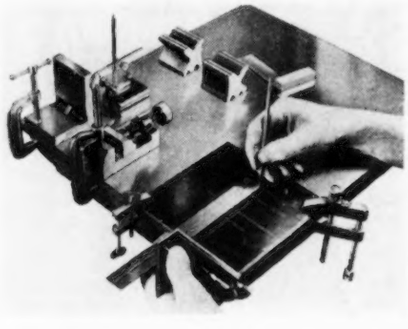
OF special interest to plants engaged in the manufacture or heat treatment of steel plate, die blocks, or kindred products, is the new Brinell tester developed by *Detroit Testing Machine Co.*, 9390 Grinnell Avenue, Detroit, for testing wide plate at any point without removal from the conveyor. The tester consists of a flat base and cross rail assembly supported by four posts. The test cylinder is mounted on a carriage sliding between the rails and is moved across the plate by a small motor. The conveyor section runs between the posts and the test ram travel is sufficient to contact the work without any adjustment other than movement of the operating lever.



In operation, the plate passes over the rollers the desired distance and is held there by the work support rail. Tests are then made across the width and the plate is released, moved forward and testing operation repeated.

Surface Plate

TWO new surface plates, measuring 15 x 8 x 3 in. and 16 x 22 x 3 in. respectively, are offered by *Delta Mfg. Co.*, Milwaukee. These new plates, said to be less expensive than hand scraped precision plates, have a true surface, massive design and ledges at edges for clamping purposes. Edges are square with each other and square with the face. Plates are adequately ribbed on underside to insure surface remaining true. These plates may be made into precision plates by simply scraping to a master plate or to each other.



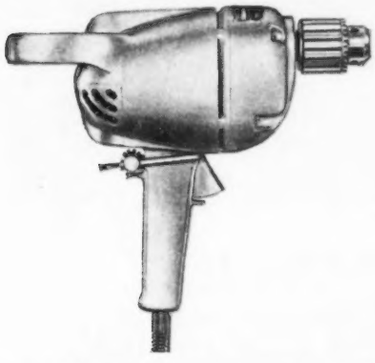
Gage Blocks

DESIGNED as a unit for a toolmaker's or mechanic's tool box, *George Scherr Co., Inc.*, 128 Lafayette Street, New York, has added a Mechanic's Own set of gage blocks to its

line of Ultra-Chex precision length standards. This set consists of five gage blocks accurate to 0.000008 in. in the following dimensions: 1, 0.50, 0.250, 0.125 and 0.0625 in.

Portable Drill

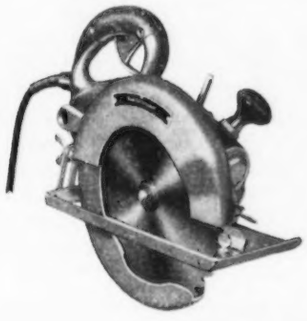
NEW model portable ½ in. drill is announced by *Skilsaw, Inc.*, 5033 Elston Avenue, Chicago. Designated



as model 80, this drill weighs 8 lb., is 11½ in. long and has a capacity in steel of ½ in. and in hardwood of 1¼ in. Body is die cast and every moving shaft is mounted on ball or needle roller bearings. Full load speed is 300 r.p.m.

Electric Hand Saw

SEVERAL important improvements, including a larger motor and heavier cutting capacities, have been



made in the model A-9 in. electric hand saw manufactured by *Fred W. Wappat*, 7319 Penn Avenue, Pittsburgh. The larger motor gives a free speed of 3400 r.p.m. and cutting capacities in the new model are 3 7/16 in. square cut and 2 13/16 in. at 45 deg. angle. Saw operates on either a.c. or d.c. and is equipped with a guard to keep sawdust from operator's eyes. Unit can be equipped with abrasive discs for cutting tile or brick for furnace relining.

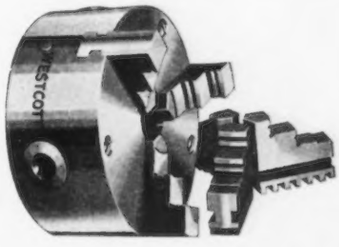
Reversible Air Wrenches

THREE new sizes of pneumatic reversible bolt wrenches have been introduced by *Chicago Pneumatic Tool Co.*, 6 East 44th Street, New

York. The new wrenches have a bolt size capacity of ⅜, ⅝, and ¾ in. respectively. Wrenches have no gears and employ a slow speed rotary power vane motor. Weights vary from 4¼ lb. for the ⅜-in. unit to 13 lb. for the ¾-in. tool.

Universal Lathe Chucks

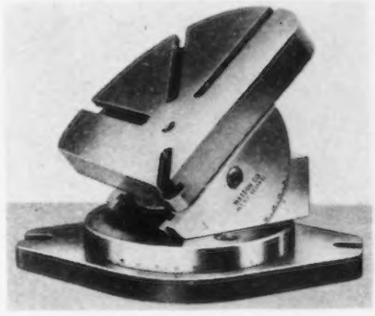
GUARANTEED to center within 0.003 total indicator reading, the new line of universal lathe chucks an-



nounced by *Westcott Chuck Co., Inc.*, Oneida, N. Y., have semi-steel bodies equipped with heat treated jaws, scrolls and pinions. These chucks are lower priced that the company's standard line and have one pinion in each chuck. Sizes range from 4 to 12 in.

Universal Angle Plate

PARTS which are too large or too irregular in shape to be conveniently held in a vise, can be clamped by



means of T-slots to the new universal angle plate offered by *Wesson Co.*, 1050 Mount Elliott Avenue, Detroit. This new fixture, which is said to greatly increase the range of work that can be done on drill presses, grinders and milling machines, is similar in construction to the Wesson universal vise except that instead of vise jaws, the universal base is fitted with a slotted top plate. Plate may be adjusted in three planes, each plane completely graduated. Once work is clamped to the plate and the angle established, it need not be disturbed as the entire device may be moved from one machine to another without removing the work.

Flexible Steel Rule

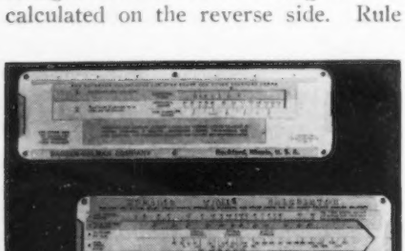
FLEXIBLE 6-in. steel rules graduated on one side in 32nds on one edge and 16ths on the other edge, and on the opposite side in 64ths on one

edge, are available from *Brown & Sharpe Mfg. Co.*, Providence, R. I. The arrangements of the graduations on this rule, designated as rule No. 306C, enables the user to turn it over from one graduation to another without turning the rule end for end. The 32nds are numbered every fourth graduation and the 64ths every eighth graduation.

Hobbing Time Calculator

DESIGNED to simplify the calculation of hobbing time, *Barber-Colman Co.*, Rockford, Ill., has developed a new slide rule which is available free of charge. One side of rule

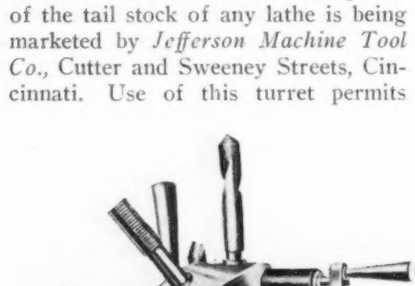
permits computation of hob approach for spur gears, spline shafts and other straight forms. The hobbing time is calculated on the reverse side. Rule



contains all standard hob speeds found on Barber-Colman machines and, by slight interpolation, the calculator can be used for determining time on other makes of machines.

Tail Stock Turret

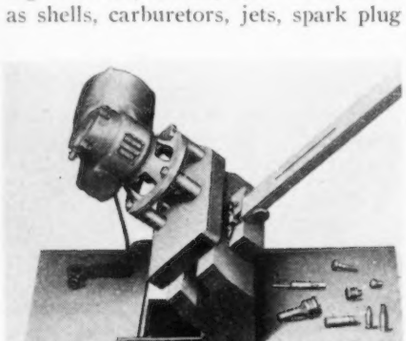
ROTARY turret head accommodating five tools and which can be attached in a few seconds to the spindle of the tail stock of any lathe is being marketed by *Jefferson Machine Tool Co.*, Cutter and Sweeney Streets, Cincinnati. Use of this turret permits



forming, roughing, boring, finishing, drilling, tapping, etc., without stopping lathe or shifting belt when operations are changed. Once set, each tool automatically centers when brought into play. This company is also offering a tool post turret which will take four tools. It can be attached to the tool post of any style or size lathe and shifting from one tool to another requires less than one second and power does not have to be shut off.

Marking Machine

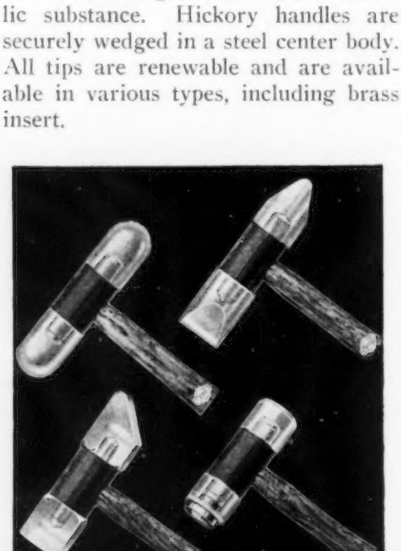
HIGH speed production marking of light or heavy formed metal parts, rolling in identifying trade names, part numbers, etc., can be done on the Hoffman production marker introduced by *Quality Die Co.*, 9309 Baltimore Avenue, South Chicago, Ill., at speeds up to 7000 pieces per hr. Machine is driven by a geared motor, with driving mechanism totally enclosed. Parts are hand fed to a gravity feed chute and actual marking operation is automatic. Marking die can have any number of lines and can embody insert types to permit changing numbers, serials, etc. Such items as shells, carburetors, jets, spark plug



bodies, round tubular or solid parts, or round pieces with hexagon or octagon flanges or shoulders can be accommodated by this machine.

Soft Face Hammers

SOFT face hammers for use on work requiring a hammer which will not mark finely finished surfaces or delicate machine parts are available from *Stanley Tools*, New Britain, Conn. Hammer tips are made of Stanloid, a tough, resilient, non-metallic substance. Hickory handles are securely wedged in a steel center body. All tips are renewable and are available in various types, including brass insert.

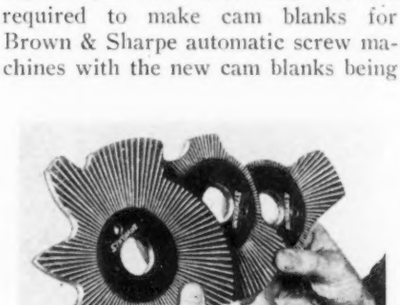


Name Plate Stamping Machine

NUMEROUS improvements, in addition to greater capacity, have been incorporated in the No. 5 name plate stamping machine offered by *H. O. Bates*, 251 North Broad Street, Elizabeth, N. J. This machine will stamp plates or parts from 0.005 to 3¼ in. thick and up to 9 x 7½ in. square, permitting stamping of assembled parts or pieces and also permitting stamping of name plates after assembly where practical. By means of the screw pressure principle, up to three tons can be applied, enabling the machine to be used to stamp stainless and other alloys. Depth of impression can be controlled for stamping soft materials and plastics. It is said to be the only unit of its kind with single replaceable dies.

Screw Machine Cam Blanks

ONLY a small wood cutting bandsaw, a disc sander and filer are required to make cam blanks for Brown & Sharpe automatic screw machines with the new cam blanks being



manufactured by *Synthane Corp.*, Oaks, Pa. Blanks are furnished in sets of three for sizes 00, 0 and 2 B&S machines. All blanks have center hole bored, pin hole drilled and radial lines for ease of layout. Blanks are good for all but heaviest feeds and are ideal for short runs because of the ease with which they can be prepared. At the manufacturer's plant, runs of 4,500,000 pieces have been recorded with cams said to be as good as new after the run.

Electric Counter

DEVELOPED to meet the need for a small, dependable magnetic counter at low cost, the Mercury counter announced by *Production Instrument Co.*, 708-16 West Jackson Boulevard, Chicago, requires only two watts to operate. The counters are tested at 600 counts per min. and have five wheels which record up to 99,999 and repeat. The instrument is said to be especially suited for electric eye operation and features tamper proof construction, non-reset, totally enclosed assembly, and small size.

STRATEGIC POSTS FOR INDUSTRY

THE mills of Revere Copper and Brass Incorporated are strategically located in 6 industrial centers for speeding up America's defense program. They coincide to a remarkable degree with the great military strategic areas of industrial America.

This is fortunate for industries and manufacturers busy with defense needs. For the strategic location of Revere Mills speeds up the supplying and delivering of basic copper, brass, bronze or other copper alloy products to where they are made into finished defense products.

Equally important, it puts these same industrialists and manufacturers in closer touch with the Revere field organization and general staff—and especially with the Revere Technical Advisors. The Revere Staff has a successful record for helping men puzzled by defense tasks to get into quick, efficient production. There is a Revere man near you in one of Revere's 26 sales offices and ample Revere stocks at our numerous distributors. You can command these services at no obligation to yourself.

REVERE TECHNICAL ADVISORY SERVICE

In many plants and industries, Revere Technical Advisory Service men are working shoulder to shoulder with executives and engineers in solving defense problems by selecting a suitable type and form of copper or one of the many copper base alloys.

These are picked men, with broad backgrounds in metal-working methods, plus highly specialized knowledge of copper and copper base alloy characteristics and applications. They are supported in this work by the full cooperation of the Revere Research Laboratories and Revere Mills.

This Technical Advisory Service comprises a thoroughly equipped Research Laboratory, manned by engineers and metallurgists for (1) developing new and better Revere materials to meet active or anticipated needs of industry; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; and (3) continuously observing developments of science and engineering with a view to their utilization in the improvement of Revere production methods and equipment.

In addition a corps of technical men are available to (1) help industrial executives make use of data developed by the Revere research laboratory staff; (2) perceive the material problems existent in industrial plants contacted; (3) assemble data enabling Revere research laboratory men to study these problems; and (4) make practical tests of the materials recommended in the plants concerned.

This Revere Technical Advisory Service set-up has been very successful in reducing costs, improving products and increasing the output for many industrial concerns.

Its service is available to you with no expense or obligation on your part.

REVERE

COPPER AND BRASS INCORPORATED

Executive Offices:
230 Park Avenue, New York, N. Y.

Sales Offices and Distributors in most of America's major cities

MILLS: BALTIMORE, MD. • TAUNTON, MASS. • ROME, N. Y. NEW BEDFORD, MASS. • DETROIT, MICH. • CHICAGO, ILL.

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• It is reported that Buick, as well as Ford, will build Pratt & Whitney aircraft engines . . . Aircraft program may have permanent effect on motor car industry in retaining airplanes as a part of its peacetime business . . . Automotive defense committee organizes.

DETROIT—Lacking only official announcement to make it complete is the news that Pratt & Whitney aircraft engines will be produced by Buick, in addition to Ford. It is expected that Buick will erect a new plant and equip it with new tools as Ford is doing because this seems to be the only practical way and, in the long run, the only economical way to get into production on such plants. As in the Ford case also, the initial order will probably be only a starting point, but it is expected that some 4000 or 5000 will be specified at once.

The entire texture of the industry which the automobile builders have built up in Detroit during the last 40 years or more is being altered swiftly, and perhaps permanently. All of a sudden the nature of the materials and the methods employed in Detroit shops undergoes important changes and, along with the new aviation products which are now scheduled, there will come some new problems and opportunities as well.

It is not too early to start thinking of what the evolution of the industry will mean in three years, or perhaps five or 10. In fact, many of the industry's leaders are now doing that very thing—although perhaps sandwiching such extra-curricular thoughts between more pressing ones pertinent to the jobs they have immediately at hand.

There are some indications of what the ultimate outcome will be—subject, of course, to many changes since the next few years will undoubtedly see the transpiration of many events than cannot now be predicted.

May Remain in Airplane Business

First of all, it is unlikely that the automobile industry, now plunged into aircraft parts and engine manufacture and committed irrevocably to the task of putting airplane manufacture on a mass production basis, will ever entirely quit the airplane business.

Once before, in the days of the World War Liberty engine and the DeHaviland airplane, such plants as Packard, Ford, Fisher and Marmon, did get into aircraft production at least comparable to what is ahead now. As a result, in the few years toward the end of the World War aircraft progressed amazingly. In fact, the entire war period meant the change of aircraft from the most frail of wood and wire construction to craft which at least had size, a degree of strength and performance, and power plants that no longer looked like washing machine motors. Post-war conditions were not of the kind that sponsored further aeronautical development, however. In the early twenties, large numbers of outmoded warcraft, incapable of economical performance, were dumped into a striving commercial aviation effort that knew only barnstorming as its big outlet. These planes also had short-lived experiences on embryonic transport lines.

It is entirely unlikely that in the period after completion of our current defense program anyone will attempt to salvage military airplanes and use them commercially. By that time, however, aviation should have made many forward strides because of the pressure of military demand. Most important is the fact that by that time there should be in existence a tremendous backlog of demand for commercial transport planes and private-owner planes. Certainly an industry accustomed to volume production of automobiles, and newly acquainted with the ways to produce airplanes in volume, will not be long in tackling the opportunities that will exist then.

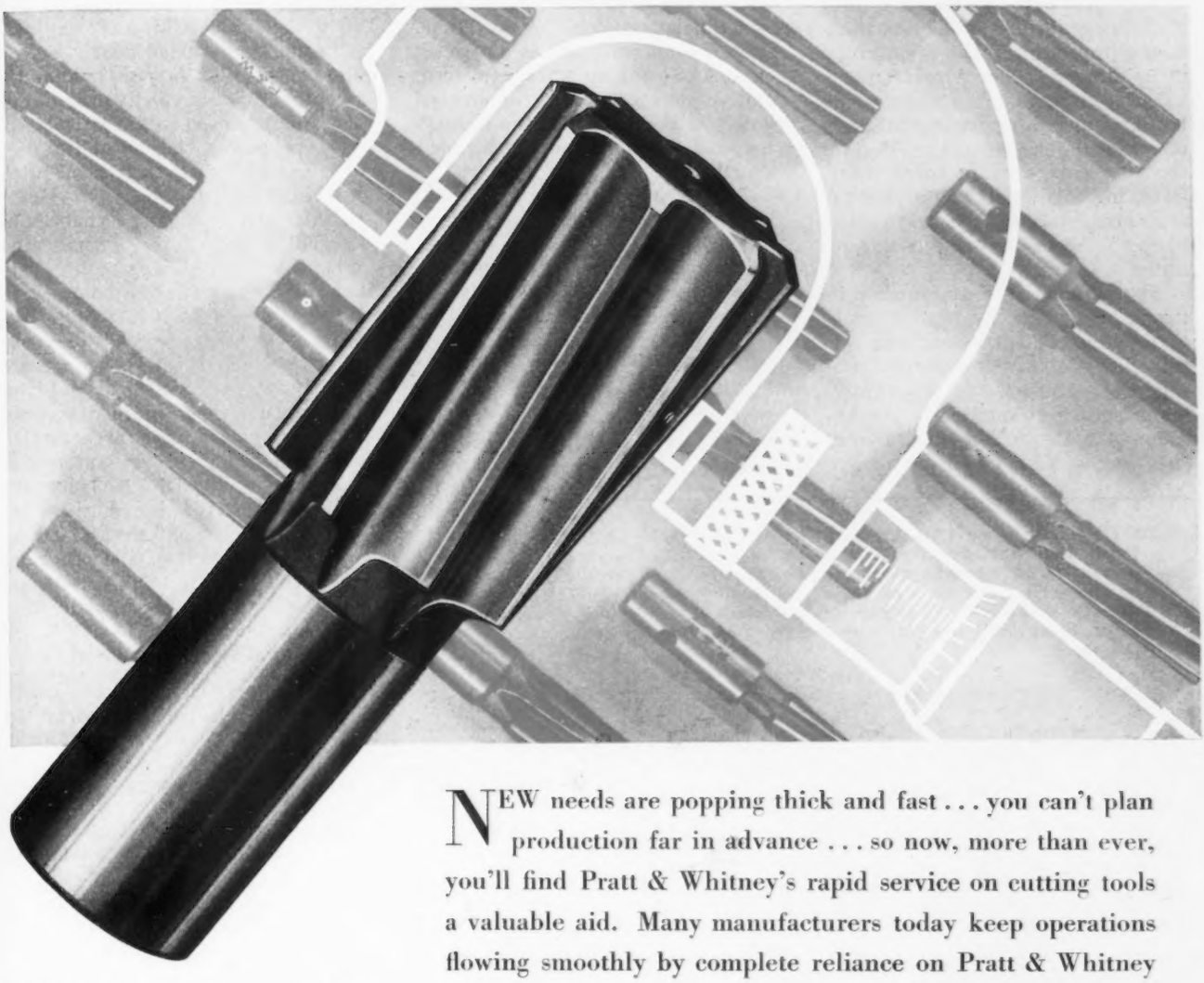
Pent-up demand for transport airplanes will exist a few years hence primarily because the aviation industry, while it is attempting to supply both Europe and America with warplanes, will not be able to fill completely the demand for more and improved transport planes. Already word has gone out from the National Defense Commission to put the building of commercial airplanes in the background temporarily. Yet, airlines throughout the country indicate that there are shortages of transport planes to meet the swelling volume of commercial travel.

Ford to Make Commercial Planes?

Without doubt this is the attitude of the Ford company, which is now rumored to be making plans for large-scale production of transport planes. Indicated very definitely is a tie-up between Ford and Hudson which would result in the manufacture of a Ford-designed airplane in the Hudson factory. The design appears to be a 26-passenger commercial plane and either the idea is to tool up over a period of time for this, or to have the passenger plane as an ultimate goal with military airplanes as the immediate goal. Neither denial nor confirmation can be obtained, but Ford, once operator of an airplane division which pioneered in production of all-metal, tri-motor airplanes, has already stated that the Ford company is going to continue in the aviation business after the defense effort is ended. Henry Ford has also stated repeatedly that he has his own airplane engine design under development.

Maximum utilization of Detroit factories in the 12,000-bomber program started by William S. Knudsen is already indicated by events here. The automotive

STUB REAMERS



The Decimal Size you want . . . . when you want it

NEW needs are popping thick and fast . . . you can't plan production far in advance . . . so now, more than ever, you'll find Pratt & Whitney's rapid service on cutting tools a valuable aid. Many manufacturers today keep operations flowing smoothly by complete reliance on Pratt & Whitney for all stub reamer requirements. P&W maintains large stocks of standard blanks, already hardened, fluted, and shank ground. When your order arrives, these are quickly finished to the *decimal* size you need.

P&W Stub Reamers are high-speed steel, carefully heat treated for toughness and durability, low in cost, free-cutting. Ideal for jobs requiring short tools, or for use in floating holders. Complete range of sizes—.06″ to 1.010″ diameters. Ask about Pratt & Whitney Stub Reamers . . . in decimal sizes.

PRATT & WHITNEY

Division **Niles-Bement-Pond Company · West Hartford, Connecticut, U. S. A.**

committee appointed after Knudsen's visit to Detroit has taken space in the Graham-Paige office building for offices and display of the sample parts and blueprints which the auto plants are now studying prior to actual launching of the program. In the same group of buildings, Tucker Aircraft Corp. has leased part of the engineering building and is preparing to carry out three defense contracts. Besides the two groups using space there, Graham-Paige itself has orders for arms materials on its books and is known to be preparing bids for additional orders.

The automotive defense committee is being actively headed by C. C. Carlton, vice-president and secretary of Motor Wheel Corp., Lansing, representing the automotive manufacturing interests. At the same time Major James H. Doolittle, famous flier recalled from civilian life to active military duty, has established offices with the automotive committee in the Graham plant. Two loads of sample airplane parts and materials were flown to Detroit from the Air Corps Material Headquarters at Wright Field, Dayton, and arranged as a primary exhibit. So far no permanent automotive set-up has been announced, but it is probable that the committee will announce an appointment shortly.

The Tucker firm, organized only last May, has received a contract for $5,900,000 worth of power-driven gun turrets and $201,000 for an experimental eight-cylinder, liquid-cooled airplane motor.

Packard Rushing New Plant

Even greater impetus has been given to the role of Packard in the nation's rearmament drive with announcement that the company is pushing its marine engine output up to a rate of five daily, compared with one per day now, and is rushing to completion the construction of nearly 1,000,000 sq. ft. of new plant for its $265,000,000 order for 9000 Rolls Royce aircraft engines.

Production started nearly a year ago on the V-12 marine engine developing 1350 hp. Deliveries began last April. These engines are being used to power the mosquito fleet of torpedo boats for the United States Navy, Canada and Great Britain and total more than $15,000,000 in value. It was indicated that the speeded production rate is a forerunner of additional orders which will be received shortly. Additional tooling expenditures of $700,000 will be made to increase the production rate. Both two-engined and three-engined torpedo boats are in use or in prospect.

Details of Packard's plant expansion and tooling program for the Rolls Royce 1265 hp. engines include announcement that $30,000,000 is being spent on the program. Deliveries of the engines are expected to start next August.

Three Buildings Planned

Three new buildings are to be erected on Packard property on either side of East Grand Boulevard.

Eventually output of the Rolls Royce engine is expected to be three engines an hour or 40 a day, about Dec. 1, 1941. Indicative of Packard's prospects in this engine manufacturing field is the fact that, in addition to British and American orders totaling $265,000,000, Packard has options for double this quantity of engines.

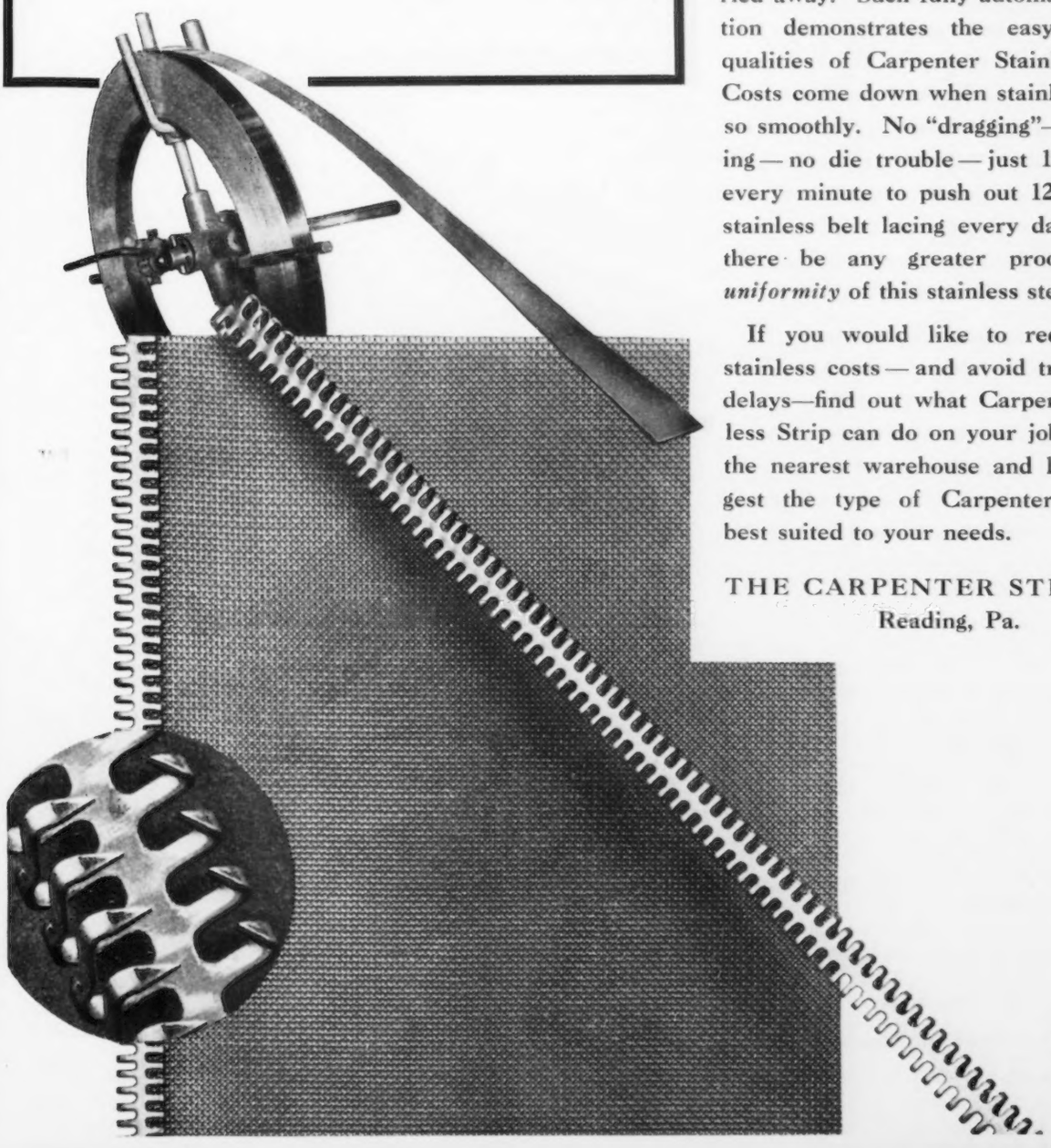
Production Up Again

Automobile output during the past week increased to 120,948 passenger cars and trucks for the United States and Canada, compared with 118,092 in the previous week and 86,200 a year ago, according to Ward's Automotive Reports.

Despite some anticipation of tapering in production volume in this month and next, Buick has indicated a contrary trend with announcement that automobile production will be stepped up in November slightly over the October level and that December will see a further increase to 36,000 units for the month.

21,500 OF THESE new type Army trucks will be built by Dodge by April, 1941. Production started early this month on a $16,500,000 order and it is expected that 200 trucks a day will be assembled. Alongside the headlamp on the fender can be seen the small lamp for "blackout" lighting. The radiator grille and brush guard is different from previous Army truck designs, being built integral with the front end and made of welded bar and rod stock.

No Trouble to punch and form *this* Stainless Strip



SO easily is Carpenter Stainless Strip handling this difficult job—that it runs through the press day after day without attention.

The stainless belt lacers for stainless woven wire conveyor belts are punched, formed and cut off automatically—falling into a waiting carton to be carried away. Such fully automatic operation demonstrates the easy working qualities of Carpenter Stainless Strip. Costs come down when stainless works so smoothly. No "dragging"—no cracking—no die trouble—just 170 strokes every minute to push out 1200 feet of stainless belt lacing every day. Could there be any greater proof of the *uniformity* of this stainless steel?

If you would like to reduce your stainless costs—and avoid trouble and delays—find out what Carpenter Stainless Strip can do on your jobs. Phone the nearest warehouse and let us suggest the type of Carpenter Stainless best suited to your needs.

THE CARPENTER STEEL CO.
Reading, Pa.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

BY L. W. MOFFETT
Washington Editor

• While nation backs Roosevelt's foreign policy, industry speculates on possible reshuffling of New Deal's domestic policy and its effects on business . . . Step-up likely in defense program

WASHINGTON—Franklin Delano Roosevelt occupies a position that never before has been achieved. By an overwhelming electoral vote but a relatively narrow plurality vote he will be inaugurated on Jan. 20 as a third-term President. A 150-year tradition, or what Wendell L. Willkie aptly called a common law, has been shattered. Despite those who scoff, and in the face of assurances to the contrary, many millions are apprehensive lest the American system of government has been seriously threatened. Now broken is a custom born with the Republic. The tradition having been violated there no longer exists the restraint that prevented an ambitious President from perpetuating himself in office. Vague references by Mr. Roosevelt during the recent campaign to the next President and to his appearance for the last time as a candidate do not allay concern.

He became the third term President on phony claims of being drafted and of implied indispensability. One who will grasp power under these thin disguises hardly will let shadowy commitments—if his campaign statements can be so called—stand in the way of aspiring to additional terms in the White House, provided he thinks he can continue in office. Mr. Roosevelt thoroughly enjoys breaking precedent. He revels in doing what was never done before. Most men love power. Mr. Roosevelt cherishes it more than most men, and he has more of it than any preceding President ever had.

Power acts as a heady wine, particularly for a man of Mr. Roosevelt's mercurial temperament. Endowed now with a distinction never before conferred, and charged with domestic and international responsibilities that in some respects are graver than even those faced by Lincoln, there is naturally concern over how Mr. Roosevelt will perform.

Same Mr. Roosevelt

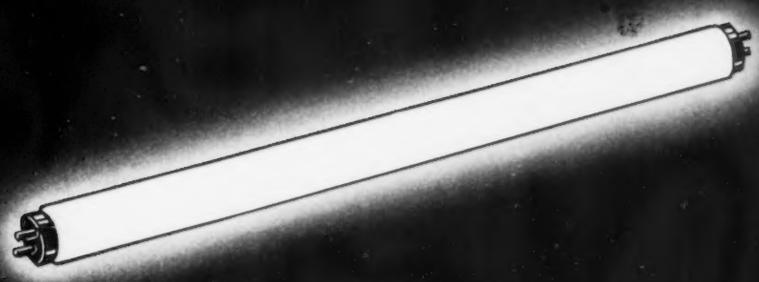
He told his Hyde Park neighbors that "we face difficult days in this country, but I think you will find me in the future just exactly the same Franklin Roosevelt that you have known for a great many years." In these days when national unity is so extremely essential—that is, as it relates to foreign policies—many hope that Mr. Roosevelt won't be exactly the same Mr. Roosevelt that he has been. They now must accept him as a third term President, but they would like to see him abandon much unnecessary power that he has. They would like to see him abandon certain smelly political alliances, and his appeals to one class against another, in return for which his critics should obviously give him full credit for his accomplishments and go along with him, though certainly never surrender the right of constructive criticism. And, the election notwithstanding, millions will continue to criticise violation of the tradition against a third term, and remain regretful that it was made possible.

Under a democracy, so it is said, the majority rule. The point is pressed that no man can stay in the White House unless the majority (of the electoral vote) so wills it. This being so it is urged that the unwritten law against a third term was nothing more than an outmoded custom, and that, far from being sacred, should be tossed aside in a period of emergency. This is the reason that no successful effort has been made to bar a third term. At the same time, a third successive term still is looked upon as a real danger to a Republic because of the great concentration of power it gives one man. Even two terms are held by many to have given Mr. Roosevelt power that assured his reelection. Those sharing this belief disagree with the view that the international crisis was the dominant factor in the campaign. Rather, they accept the more realistic, if not pretty, conception of the *The Cleveland Plain Dealer* that "Checks from the Federal Treasury scattered in showers over the countryside constituted an argument more powerful than any plea in support of an unwritten law." Then there was the New Deal's enormous patronage, its unprecedented expenditures of the past, present and future.

Foreign Policy Supported

It is to be taken for granted that Mr. Roosevelt will find the country strongly back of him on his foreign policy, so there is left speculation concerning how, if at all, he reshuffles the New Deal deck on domestic policy and its effect on business. Certainly Mr. Roosevelt has been bitter at times in his attack on business. He has not liked business, perhaps not because he has anything against business as such, but because most of business has opposed him and his policies. Business thinks Mr. Roosevelt and his satellites have undermined the economic structure of the country with their extravagant spending, and philosophies—some preached and some applied—that are held to be of a definitely socialistic nature. Business thinks, too, that it has been used as a political football. In his campaign Mr. Roosevelt, seeking to offset business hostility, pledged his firm belief in private enterprise and private property. Business hopes he won't indulge in

"WHAT CAN MY BUSINESS GAIN



from this new

G-E FLUORESCENT LIGHTING?"

IF you must meet stiffer production schedules immediately, even before you can train new employees or enlarge your plant, you should investigate G-E Fluorescent Lighting *today!*

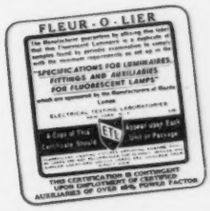
Many mills and factories are cutting down rejects, increasing production, and improving employee working conditions by adding the *extra* light that G-E Fluorescent Lighting makes possible...light that is the next thing to real daylight in color, quality, coolness. Let General Electric tell you the inside story. Phone your G-E lamp man or your electric service company! Meanwhile tear out and mail coupon or write us on your business letterhead *now!*

COMPLETE FIXTURES NOW AVAILABLE

Industrial unit, 100 watts, using two 40-watt, 48-inch G-E MAZDA F lamps.

Industrial unit, 75 watts, using two 30-watt, 36-inch G-E MAZDA F lamps.

Industrial unit, 100 watts, using two 40-watt, 48-inch G-E MAZDA F lamps.



This label identifies Fleur-O-Lier fixtures, made by over 35 experienced manufacturers, and certified by Electrical Testing Laboratories as meeting 50 specifications set up by MAZDA lamp manufacturers, when equipped with ballasts and starters certified by E. T. L.

The certified fluorescent fixtures shown above are only a few of the many complete fixtures now available through G-E MAZDA lamp distributors. G. E. does not make fixtures but is glad to recommend Fleur-O-Liers and RLM Industrial Fixtures.

PRICES REDUCED ON G-E MAZDA LAMPS

On June 1, 1940, General Electric announced sweeping price reductions on Fluorescent and many other types of G-E MAZDA lamps for home and business, including Mercury Vapor and Silvered Bowl MAZDA lamps.

G-E MAZDA F *lamps are recommended for use only with equipment providing good power factor, such as Fleur-O-Liers, or RLM Industrial Fixtures.*

A WORD OF ADVICE

To be sure of the high quality that comes from General Electric lighting knowledge and leadership, always specify G-E MAZDA F lamps. They assure maximum light output for current consumed and they're made to stay brighter longer!

G-E MAZDA LAMPS
GENERAL ELECTRIC

General Electric Company, Dept. 166-IA-K
Nela Park, Cleveland, Ohio
Please mail, without obligation, complete information about G-E Fluorescent Lighting for my plant.

Name _____
Name of firm _____
Address _____

his unfortunate habit of saying one thing one day and doing the opposite thing the next day.

Certain it is that Mr. Roosevelt wants business back of him on the national defense program and business, just as much concerned as the government, is pushing and pulling with all of its power to do what the huge job demands. This being so it is to be assumed, if not assured, that during the emergency at least the Administration will not bait business. It may bite it here and there but a widespread onslaught is not looked for. After all, pink economists, and starry-eyed theorists do not produce. And production is urgently sought. The "on order" period, however, has not passed. Mr. Willkie said it, but it is doubtful if the New Deal feels itself seditious in accepting the earthy and stimulating doctrine that "Only the strong can be free. And only the productive can be strong."

Henderson Or Nelson

It is believed Mr. Roosevelt now will step up the defense program. Speculation has it that, though he will continue to be the "boss," to use his own word, the President will select a chairman of the defense commission. Guesses—and that is all they are—have it that Donald M. Nelson, of Sears, Roebuck & Co., will be chosen, though another guess names Leon Henderson. Mr. Nelson now is Defense Commission Coordinator of Purchases. Mr. Henderson is a member of the commission and head of its Price Stabilization Division. It would be no surprise to see new iron and steel placed under a licensing system soon. Such a system, it is believed, would be similar to that applying to scrap. In effect it is an embargo except on shipments to the Western Hemisphere and Great Britain.

Rumors regarding changes in the cabinet have it that Madam Perkins, Secretary of Labor, never liked by AFL, CIO or industry, will be shelved. Names of such men as Mayor LaGuardia and Sidney Hillman are heard as her possible successor. Harold Ickes, the New Deal's chief hatchet man, who would snarl at himself if the earth were otherwise void, last week tendered his resignation as Secretary of the Interior, and quietly prayed that Mr. Roosevelt would not accept it.

Deficit On Deficit

New defense appropriations are in the offing and the debt limit, kited from $45,000,000,000 to $49,000,000,000, will be raised again, and deficits, which have been with the New Deal throughout its almost eight years, will pile even higher. And so will taxes become more altitudinous. These profits being made under the present synthetic defense prosperity will be grabbed and taken over by the Federal Treasury and in turn become the source of the usual lavish handouts and subsidies.

Mr. Roosevelt is committed to extension of social security and wage-hour control, the latter to take in additional workers. The relief program likely will be changed little, if at all. The same is true with respect to defense work training. Public power resources likely will be expanded in the name of national defense.

Efforts will be made to unite organized labor, or to at least soothe the deep feeling between CIO and AFL. John L. Lewis's exit as head of CIO, which he promised if Roosevelt were reelected, was looked upon as removing a big obstacle toward peace within organized labor. Employers will not get any relief from labor pressure. The contrary may be true. Reports have it that should Philip Murray take over the reins as head of CIO he would intensify even further SWOC efforts to organize "little steel."

A Subservient Congress

Mr. Roosevelt probably will have a more subservient Congress than ever. That is saying a great deal. Nevertheless, the new Congress will see the overwhelming Democratic house majority increased by seven, and the overwhelming Democratic Senate majority reduced by only four. The Conservative Democrats dislike the New Deal cordially but many got into Congress on the coat tails of Mr. Roosevelt and as a matter of saving their political hides most of them will do just about what he tells them to do.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

SOFA SOLDIERS! HA-HA--TH' LACE LEGION! YOU GUYS'LL NEVER HAVE TO WALLOW THRU SEAS OF MUD, BARB WIRE, GAS AN' MACHINE GUN BULLETS, OR SLEEP IN PUDDLES LIKE US GUYS DID--PLEASE DON'T SAY SOLDIERIN'--SAY CAMPIN' TRIP!
I BELIEVE HE'S ACTUALLY MAD BECAUSE THEY WON'T HAVE TO GO THRU WHAT WE DID IN 1918--THEY'LL PROB'LY GO THRU AS BAD, ONLY DIFFERENT
WORSE--BECAUSE A BOMB DROPPED ON A GUY IN ALL THAT MISERY HE WAS IN WOULDN'T BE HALF AS BAD AS ONE DROPPED ON A GUY IN ALL TH' LUXURY HE THINKS THEY'RE GONNA BE IN!
T. M. REG. U. S. PAT. OFF. COPR. 1940 BY NEA SERVICE, INC.
THE GOOD OLD DAYS
J.R.WILLIAMS 11-15

New Steps Taken to Speed Defense Orders

Washington

• • • **In an effort** to avoid delays to the defense program resulting from liquidated damage clauses in contracts awarded by non-military agencies of the government, the White House has instructed all contracting agencies to refrain from invoking such penalty provisions when delays are made necessary to meet delivery dates on Army and Navy contracts bearing preference ratings.

Acting at the request of the National Defense Advisory Commission and the War and Navy Departments, President Roosevelt in a letter to executive departments and independent establishments of the government explained the system of preference ratings adopted by defense agencies and added:

"Instances have arisen where potential contractors have been hesitant to accept Army and Navy preference rates contracts because such contractors are already working on other government contracts which contain liquidated damage clauses. Unless industry is assured that delays caused by the acceptance of and compliance with preference rated contracts will not result in attempts by the government to collect penalties, the procurement of materials necessary to the defense program may be unduly retarded.

"Accordingly, you are requested to instruct the appropriate members of your staff, including any contracting officers subject to your jurisdiction, to cooperate fully with the War and Navy Departments with reference to the operation of the preference system.

"They should be specifically instructed to refrain from taking any action pursuant to the liquidated damage clause of any contract over which they have supervision whenever they find that delay in delivery by the contractor became necessary in order to meet delivery dates on Army and Navy contracts bearing preference ratings. Likewise, the Secretaries of War and Navy are requested to inform their respective staffs that they are to be guided by this general principle with respect to delays which result from the operation of the preference system."

Last word
ON PRECISION
GAGES AND GAGING

"SHEFFIELD GAGES" just off the press is a comprehensive presentation of precision gages — design, construction and application together with standards and constants useful in practical inspection work.

Manufacturers engaged in the manufacture of engines, machine tools, automotive or military equipment, or any enterprise where inter-changeability of parts is essential, will find this book very useful.

Write for your copy on your own letterhead—no obligation.

THE SHEFFIELD GAGE CORPORATION
1522 EAST THIRD STREET
DAYTON, OHIO, U. S. A.

Fatigue Cracks

BY A.H.DIX

Arc Argot

• • • Charles H. (Westinghouse) Jennings supplies us with a list of slang expressions common in welding shops. Among the more picturesque are:

Dingle balls	Molten particles of spatter falling from the electrode when welding in the vertical and overhead positions.
Banana weave	A weaving motion applied to the electrode which has the characteristic shape of a banana.
Grapes	Elongated particles of weld metal hanging from the surface of an overhead weld.
Icicles	Localized raised sections on the reverse side of a welded joint, formed by drops of molten metal that have solidified.
Kick	Electric shock.
Worm holes	Elongated gas holes sometimes found in deposited weld metal.
Islands	Isolated patches of slag on the surface of a weld.
Stumbling	The act of unintentionally interrupting the welding arc.
Volcano	Eruption occurring after the first layer of a multiple layer weld, caused by the explosion of gas inclusions in the under layers.
Doodle berries	Same as dingle balls.
Jazz-box	A small size a-c welding transformer.

Aptronym

• • • Now that we have given electric welding a break we will square things by reporting that the rector of the church on Madison Avenue and 36th Street, just a No. 2 iron shot from here, is J. J. Gass.

Button Battle

• • • One way of solving the unemployment problem would be to hold a presidential election, God forbid, once a year. At 50c. an hour the value of the man-hours spent by the nation's 48 million captains in discussing the relative merits of the courses for the ship of state, as plotted by Messrs. R. and W., not to mention Messrs. B. and B., must have run close to a half billion dollars.

This is an unavoidable tax that Democracy lays against its practitioners, and one that is paid all too gladly. We are happy that we can now divest ourselves of the cares of state and get back to work.

The Slip That Cost a Thousand Votes

• • • This page's only criticism of the manner in which the candidates conducted their campaigns concerns the President's reference to the phrase, *"Martin, Barton and Fish,"* as *"a perfectly beautiful alliteration."* It has a punch to it like "Wynken, Blynken and Nod," and if there is a name for it we never heard of it. But it is not perfect, nor beautiful, nor alliterative.

Tenstrike

• • • Associate Editor Bill Phair, who shepherds the charts in "The Industrial Pace's section (see page 110), and whose charges are at the moment butting their noses against the ceiling, telephones us breathlessly that page 1095 of the Manhattan phone book lists What's the Big Idea Associates, an advertising agency, and "Whatsit," a pub.

Blondes Come Extra

• • • "I note on page 66 of the Oct. 31 issue the caption, 'Shown at the top is a fully equipped scout car rolling off the assembly lines of the White Motor Co.'s Cleveland plant.' I'll say they are fully equipped, even to the machine gunners."—**Earl H. Fisher, Asst. to V. P., Unitcast Corp., Toledo.**

The gunners are not standard equipment, but are extra, like the blondes that adorn the new models in automobile shows.

Bare Idea

• • • Mr. Fisher also has a solution to the problem about the 190 lb. man who must carry three 5-lb. packages across a bridge that will sustain only a 203-lb. load. He says, *"Let the man pick a dark night, reduce his weight by removing his clothing, and carry the packages over in the nude."*

The solution is ingenious but unacceptable, as the man, we should have mentioned, is pot-bellied and therefore painfully modest.

Shining Simile

• • • Bill ("On the Assembly Line," see page 68) Sherman, your Detroit secret agent, thinks this simile, sprung in casual conversation by W. J. (Minneapolis-Honeywell) McGoldrick, rates the Hall of Fame—"As dry as a Pullman shine." We rate is B plus.

Gem

• • • An A plus rating is earned by this favorite expression of Emerson Findley's, our Cleveland advertising representative, picked up from a forgotten source: *"He wasn't thinking, but was simply rearranging his prejudices."*

Take a Bow, Don

• • • Talk about fast work! George Tinnerman's fine talk before the luncheon group Oct. 15 was reviewed in The Iron Age, reputable (**thank you!**—Ed.) trade weekly, in its Oct. 17 issue. The term "flying reporter," certainly ought to be applied literally to that magazine's news garnerer in this area.—**The weekly news bulletin of the Cleveland Engineering Society.**

Fast-moving garnerer is tall, quiet Don James, your favorite family journal's "Fifth City" editor.

When McKinley Was In Flower

• • • "Drill, Ye Tarriers, Drill!" the headline on a recent Bullard ad, jerks Sam DeWolf back to the days of the Edison phonograph with cylinder records and 5-ft. horn. The words, as he heard them a dozen times a day, were:

Drill, ye tarriers, drill,
For ye work all day for very little pay.
Drill, ye tarriers, drill.
Oh Pat was a fine man all around;
He married a great big fat far down.
Drill, ye tarriers, drill.

The fifth line sounds lame, but we can't prove it is wrong, as we didn't have that record. Ours were *"How Would You Like to be the Ice Man"* and *"All I Want is a Little Bit Off the Top."*

Stopper

• • • 50,000,000 Frenchmen *can* be wrong. . . . AND WERE!—*Warner & Swasey.*

Aptronym

• • • A business that is aptly named is a Detroit waste metal products firm. The name is H. B. Hamburger & Co.

Puzzles

• • • As you probably never found out, Mary in last week's problem is 27½ years old, and Ann is 16½.

If you can get this one in 150 seconds the time you spent on math wasn't wasted:

Mrs. J. was four times as old as her daughter seven years ago but she will be only twice as old as the daughter seven years from now. What is the difference in their ages?

FAIRBANKS-MORSE TURBINE PUMPS

Complete range of capacities (35 g.p.m. to 4000 g.p.m.) for electric motor, Diesel or gasoline engine, or steam turbine drive. Open or closed impellers, oil or water lubrication. Today's 6" F-M Turbine is 23% *more efficient* than the same size was in 1927; today's 10" turbine is 21% more efficient than the 10" pump was in 1927!

YES, a conspiracy between a pump and the power meter!

A conspiracy that can—and DOES—go on unnoticed year after year in hundreds of plants where old pumps are imposing a 10% "penalty tax" on the operating budget? That *is* happening in your plant—if your pumps are old. Due to improved methods, improved materials, and improved design, today's Fairbanks-Morse Pumps are at least 10% more efficient than the same types were ten years ago. Thus, if your old pump is as good as new (it probably isn't), it is costing you at least 10% more to operate it than it would cost to operate a new one. *10% is a good return on any kind of investment!*

It won't cost you anything to find out how much new pumps would save you. Write Fairbanks, Morse & Co., Dept. 47, 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.

7837-PA40.70

FAIRBANKS · MORSE PUMPS

DIESEL ENGINES · ELECTRICAL MACHINERY · RAILROAD EQUIPMENT · WASHERS-IRONERS · STOKERS
MOTORS · FAIRBANKS SCALES · WATER SYSTEMS · FARM EQUIPMENT · AIR CONDITIONERS

News of Industry

Photo by Wide World

TYPES OF MOTORIZED transports for the U. S. Army were demonstrated recently at the Camp Holabird quartermaster depot, Baltimore. Left to right are a 6-ton, 6-wheel truck used to transport a 3-in. anti-aircraft gun; a 2½-ton, 6-wheel truck used to haul a 75 mm. light field artillery piece; a 2½-ton cab over engine close coupled 6-wheel truck for transporting light field artillery guns; a half-ton 4-wheel reconnaissance car, and a new one-fourth ton 4-wheel midget truck.

Longer Work Week Held a Defense Need

• • • **Lengthening of** the prevailing hours of work in this country for the period of the emergency, is found to be the most expeditious, if not the only way to provide the increased output required for the defense program, according to a study of "Labor Policy and National Defense" prepared by Dr. Leo Wolman of Columbia University for the Division of Industrial Economics of The Conference Board.

"The labor policy of our preparedness program is hard to determine," according to the report, "because many of the essential elements of the program are still practically unknown. Both the size and the time schedule are unsettled. But there is much to be learned from the experience of other countries and from the virtual certainty that we shall require more industrial capacity and labor than we now have available."

British experience in both the first and second World Wars is cited by Dr. Wolman, as showing that a substantial lengthening of the work week is essential to increased output.

The most important objections to any extension of prevailing hours are found to be: (1) that the vast army of unemployed can supply emergency needs for additional labor; (2) that fewer hours make labor more efficient and that more efficient labor increases the productivity of industry; (3) that the health of labor would suffer from working longer hours; and (4) that labor's hard-earned victory in the matter of shorter hours might be lost.

As to meeting the demand for labor from the unemployed, Dr. Wolman says: "Men and women out of work for more than five years lose their skills and habits of work. When in time jobs do become available, many of the unemployed are no longer competent to fill them, and unless they are afforded the facilities to relearn what they have forgotten, they stand the chance of remaining members of this army of the unemployed and unemployables for some time to come."

It is pointed out that British industry suffers from critical shortages of labor and is forced to work unusually long hours, despite the fact that unemployment in that country was estimated at 800,000, or nearly 6 per cent of the working force, as recently as Aug. 12, 1940. Similarly, in the United States today there are special shortages in many skilled trades even though there are great numbers of unemployed. Until a sufficient percentage is trained, it is observed, utilization of the unemployed cannot be considered an alternative to increasing the prevailing hours of work.

It is industry's efficiency and productivity, Dr. Wolman says, that make reductions in hours possible without impairing labor's productive performance. It does not follow, however, that an industry working a 40-hour week would see its total output reduced or only insignificantly increased if it raised its schedule of hours to 50 or 55 a week. On the contrary, it would be surprising if the new schedule failed to produce a substantial, and perhaps a proportionate, increase in total output.

The defense program administrators must shortly face the problem of obtaining a necessary labor supply at satisfactory cost, says Dr. Wolman. To do so, they must be enabled to maintain adequate standards of hours and output to insure uninterrupted operations.

3000-Plane Engine Order Goes to Ford

Washington

• • • A $122,323,020 contract for 3000 aircraft engines was awarded the Ford Motor Co., Dearborn, Mich., last week by the War Department. A $11,436,042 contract for Army and Navy aircraft went to the Wright Aeronautical Corp., Paterson, N. J. Also announced by the War Department was a $8,074,406 contract to the Colt's Patent Fire Arms Mfg. Co., Hartford, calling for the installation of additional equipment for the manufacture of infantry weapons.

Speed Urged In Ordering Heat-Treating Furnaces for Defense

• • • **Heat-treating** furnaces needed for manufacture of munitions and other metal products essential to the defense program should be ordered immediately if delivery is to be assured when it is actually required. This is the gist of a survey just completed of conditions in the heat-treating furnace industry. The survey, made by Industrial Furnace Manufacturers Association, Inc., also disclosed that orders for heat-treating furnaces are being placed at a rapidly increasing rate which is already at an all-time high.

In the case of large production furnaces built on the users' premises, (a) about half the manufacturers of this equipment cannot maintain present deliveries with any further increase in volume unless there is a greater acceptance of established designs by users; (b) the balance of the manufacturers of this equipment can still increase their volume by about 25 per cent without extending their delivery schedule, and could do still more if so many users would not insist on innovations in design which cause delay in delivery of from one to two or more months, (c) a further increase in production of from 25 to 50 per cent could be effected if users would, (as they very often could) give the furnace manufacturers 60 days' more time in which to build the equipment.

The survey noted that practically all manufacturers of smaller furnaces which are shipped complete from the factory could increase their present output 10 per cent or more without extending deliveries. They could also raise their output by another 25 per cent if users would give them two more months' production time.

The Industrial Furnace Manufacturers Association, Inc., states that the industry has worked closely with the Ordnance Department on problems of mutual interest, and now turns to its customers for cooperation, in order to maintain the supply of furnaces necessary to meet the demands of the defense program. The following specific ways have been suggested in which users' cooperation would be most helpful:

A. By issuing orders for furnaces among the first orders placed for equipment.

B. By not insisting on shorter deliveries than are absolutely necessary.

C. By utilizing in every way possible the successful designs which have been established by the different furnace manufacturers to meet practically all requirements of ferrous and nonferrous products.

D. By reviewing the delivery promises of equipment already ordered and, where there has been a delay on some other essential piece of equipment or building, notifying manufacturers of furnace and other equipment that they can have that much more time in which to make deliveries. This would afford immediate relief.

20% of Fansteel Men Subject to Draft

Chicago

• • • **No rights or benefits will be lost because of the draft by employees of Fansteel Metallurgical Corp. and its affiliate, Vascoloy-Ramet Corp., with plants located at North Chicago and Jersey City. Employees will be regarded as on a leave of absence and their group insurance premiums will be paid entirely by the company. Robert J. Aitchison, president, estimates that approximately 20 per cent of the firm's employees are subject to call for military service.**

Coming Events

Nov. 14 to 16—Purchasing Agents Association of Cleveland, exhibition, Cleveland.

Dec. 2 to 7—National Exposition of Power and Mechanical Engineering, New York.

Dec. 9 to 13—National Association of Manufacturers, annual meeting, New York.

U.S. Signs Bolivian Tin Ore Contracts

Washington

• • • **Contracts** between the Metals Reserve Co., and tin ore producers in Bolivia have been completed, calling for purchase of tin ores and concentrates sufficient to produce 18,000 tons of fine tin a year for the next five years.

The Metals Reserve Co., in an effort to ease the current exchange situation for Bolivians, will advance up to 80 per cent of the value of the tin ores on warehouse receipts at the ports of Arica and Antofagasta, Chile. The ore will be shipped from these ports.

Federal Loan Administrator Jesse Jones reiterated the announcement that the RFC at an early date will arrange for the construction of a tin smelter in the United States but did not divulge further details.

Mr. Jones listed these companies as participating in the contracts between the RFC affiliate and tin ore producers: Compagnie Aramayo de Mines en Bolivie, The Compania Minera de Oruro Group, Compania Minera Unificada del Cerro de Potosi, Associacion Nacional de Mineros Medianos, and Banco Minero de Bolivia.

Proper apportionment between the different mining interests and faithful performance of the contracts by the tin producers has been guaranteed by the Bolivian Government.

Fire Extinguisher Production Up In '39

Washington

• • • **An increase in** production accompanied by slight declines in employment and wages for 1939 as compared with 1937 are reported by the manufacturers of portable, chemical fire extinguishers. Preliminary figures released by the Bureau of the Census show that value of products increased from $8,889,160 in 1937 to $9,228,416 in 1939; number of employees declined from 1041 to 995 while their wages dropped from $1,401,258 to $1,273,055. Number of establishments totaled 28 in 1939; and 25 in 1937.

50 Companies Expand At Chicago in Month

Chicago

• • • **Largest single month** of industrial development for a decade took place here in October. Fifty concerns announced expansion plans amounting to $48,000,000. Three of the concerns are starting operations in the Chicago area for the first time, one of these—the War Department's shell loading plant—to cost $14,000,000. Among those firms in the metal working industry involved in the expansion plans are Stone & Webster Engineering Corp., earlier awarded contracts to build TNT and DNT explosive plants to be operated by E. I. du Pont de Nemours Co., were awarded an additional 30 million for construction of facilities three times larger than those originally planned. Sanderson and Porter will design, construct and operate a $14,000,000 shell packing plant at Wilmington, Ill.

Electro-Motive Corp., McCook, Ill., is constructing a $500,000 addition to its diesel locomotive plant. Chicago, Milwaukee, St. Paul & Pacific Railroad has launched a development program totaling $541,000. In its Galewood Yard improvements have been made to expedite handling of less-than-carload freight. A $25,000 one-story coach wheel shop will be constructed here and a $16,000 potato warehouse will be built at Bensonville, Ill.

A new plant, costing $278,000, will unite three plants in one for Charles Bruning Co., Inc., which will more than double the firm's size and production. General American Aerocoach Co., division of General American Transportation Corp., is doubling factory space and adding new machinery.

Inland Steel Co., will spend about $300,000 for construction and new equipment in rebuilding the laboratory at its main plant in Indiana Harbor, Ind.

A $147,990 heating plant will be built at the Great Lakes Naval Training Station. Ceco Steel Products Corp., Cicero, Ill., is building a 65,000 sq. ft. addition at a cost of about $125,000. A plant addition, also costing around $125,000 has been completed by Bliss & Laughlin, Inc., Harvey, Ill. Goodman Mfg. Co., will soon complete a $100,000 high ceiling warehouse. About $25,000 for plant addition and $15,000 for equipment will be spent by Liquid Carbonic Corp.

All told, more than 300 Chicago firms have expanded plants and facilities during the year and industrial expansion plans in this area give no apparent indication of decline at this time.

Colonial Broach Co. Building Plant Addition

• • • **Ground was broken** this week on Hoover Road, Detroit, for construction of a new plant by Colonial Broach Co. The plant, which will comprise some 20,000 sq. ft. of space will provide increased facilities for manufacture of broaching machines, jigs, and fixtures. Production of broaches, drill jig bushings, "New Method" steel stamps, marking devices, etc., will be continued at the company's main plant at 147 Joseph Campau. The new machinery plant is expected to go into operation about Jan. 1.

Fifth Expansion Since 1936 for Ampco Metal

Milwaukee

• • • **Closely following** upon a recent 10,000 sq. ft. addition to its plant, Ampco Metal, Inc., will soon launch another enlargement, a foundry plant of 8000 sq. ft. In the past three years, Ampco has expanded facilities four times, increasing its machine shop twice, building a weld rod department, and constructing a two-story office building for a total increase in plant area of 56,000 sq. ft.

Johns-Manville Votes $625,000 Plant Expansion

• • • **A $625,000 expansion** program by Johns-Manville has been approved by the directors, according to President Lewis H. Brown. The program will include installation of manufacturing equipment in the recently acquired plant at Zelienople, Pa., where insulating brick will be manufactured, and the building of new warehouses at the company's plants at Nashua, N. H., and Richmond, Ind., the announcement said.

Ohio Plant Building Heaviest in Years

Cleveland

• • • **New plants and** additions to present production facilities are being announced so fast in Ohio that it is difficult to keep abreast of them. The wave of construction is the greatest in over ten years here. Following are some of the latest announcements:

Cleveland Pneumatic Tool Co., maker of airplane landing gear struts, is erecting its fifth new addition of the past year. The new structure will add 36,000 sq. ft. of floor space. The five additions involve 250,000 sq. ft.

Wheelock, Lovejoy & Co., Inc., is adding a new structure 210 ft. x 97 ft. to its facilities here.

Marquette Metal Products Co. is erecting a structure 65 x 200 ft. Chase Brass & Copper Co. is building a new chemical research building. Forest City Foundries Co. is building a new one-story structure 34 x 140 ft. Federal Foundry Supply Co. at Cleveland is building two additions.

The Bolton-Pratt Co. will build an addition to the plant of the Lucas Machine Tool Co., according to plans by H. M. Morse & Co., architects. The new section will be one story 45 x 175 ft.

An addition will be built for the Towmotor Co. to house an office and factory. C. B. Rowley & Associates are architects. The structure will be one and two stories, 45 x 150 ft., of brick and steel sash construction.

Emery Machine Co., at Cuyahoga Falls is erecting a plant addition 40 x 80 ft. Engineering & Materials Co., Amherst, will start construction of a new factory building in early 1941, to be followed by a second unit later. Bannish Rustproofing Co., Cleveland, will double its present space with a new plant 73 x 100 ft. Kitchen Katchall Corp. at Greenwich will erect an addition for manufacture of a machine to remove grease from spun aluminum.

Timken Roller Bearing Co. has started at Canton construction of a $170,000 addition to its Gambrinus bearing plant. The building will be 220 x 280 ft., sawtooth

(Please turn to page 84)

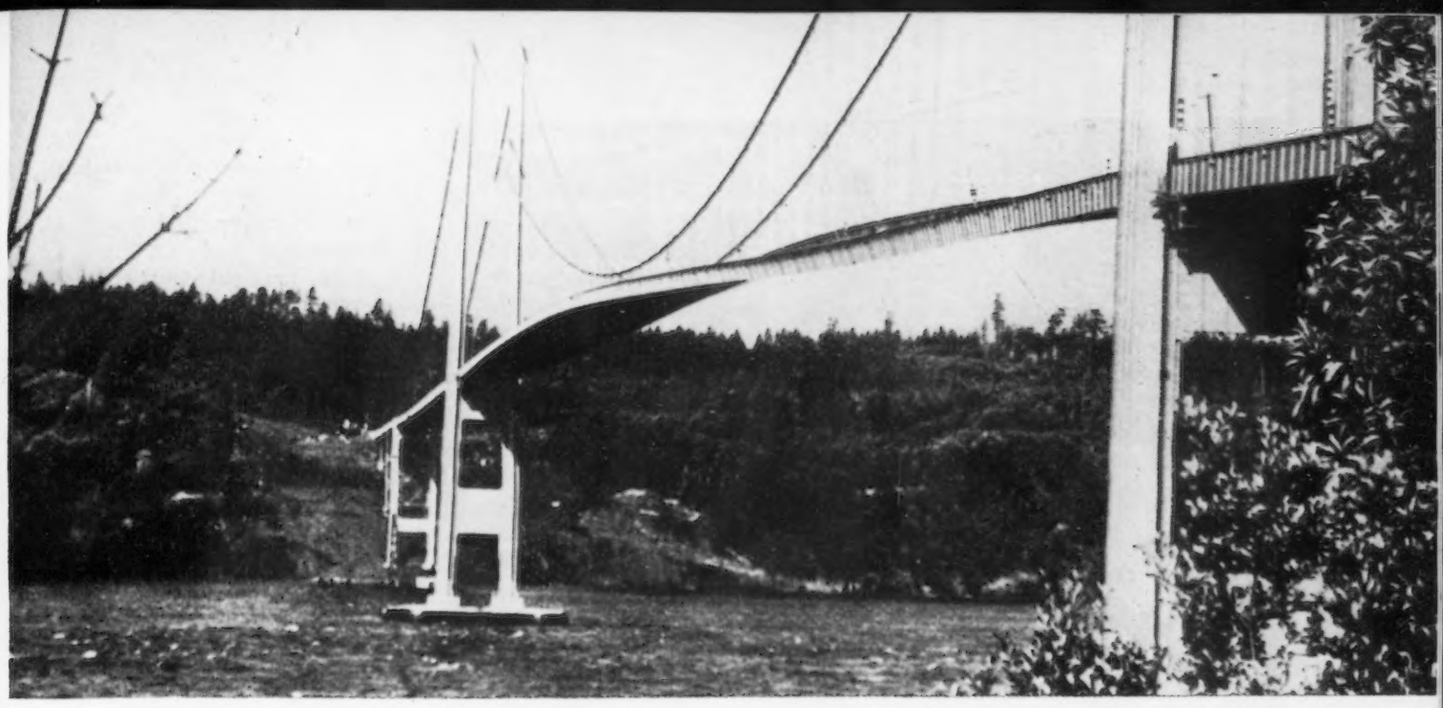
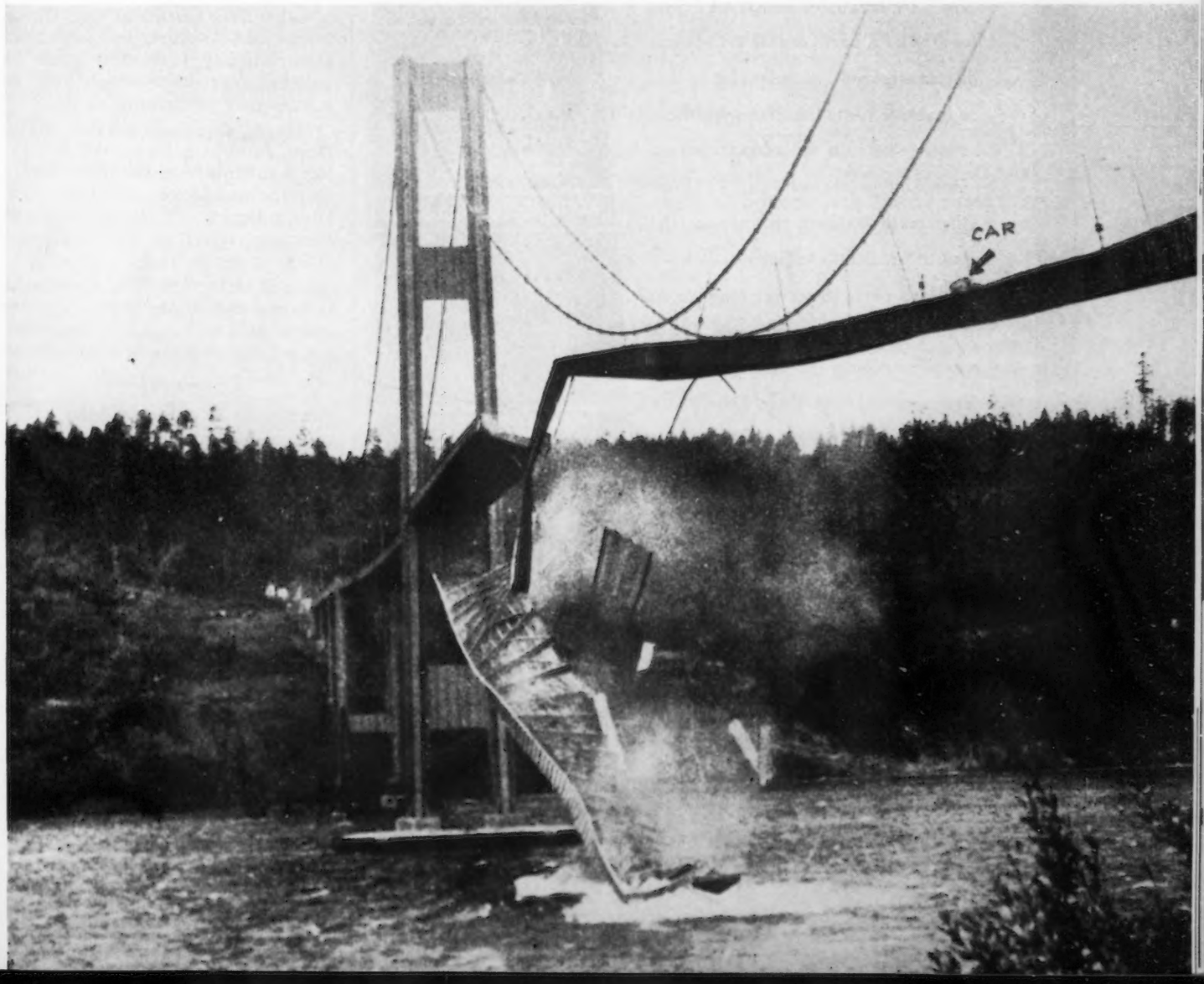


Photo by Bashford-Thompson, Tacoma, from International

BRIDGE COLLAPSE—These unusual pictures show the $6,500,000 Tacoma "Narrows" bridge at Tacoma, Wash., just before (above) and just after (below) the bridge collapsed under the pressure of a 35 mph. gale. The top photograph shows the structure twisting and turning in the grip of the gale. Shortly after this photograph was made the center section of the bridge plunged into the waters of the Puget Sound. The picture below shows the bridge at the exact instant it struck the water. Note the car still on the bridge. The driver escaped by crawling to safety. Built largely as a defense measure to connect Seattle and Tacoma with the Puget Sound Navy Yard at Bremerton, the span was the third largest single suspension bridge in the world. Ever since its opening last July, the bridge had a pronounced longitudinal roll. Its collapse was attributed by Charles E. Andrew, chief construction engineer, to the use of flat, solid girders along its sides instead of open girders.

o o o

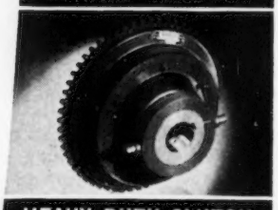


Send us an order for 14,000 parts

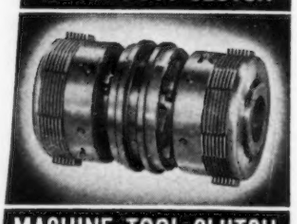
Complete supply of parts is always available in the Twin Disc stock room.

● Handling an inventory of some 14,000 replacement parts, Twin Disc has perfected a "parts service system", by means of which all orders for standard parts are filled the same day as received . . . orders for special or inactive parts handled with minimum delay. As an added convenience and protection, the 27 Twin Disc parts stations throughout the country maintain sufficient stocks of standard parts to service equipment in their respective territories. These complete service facilities are your assurance that no Twin Disc product will ever stand idle through lack of parts or service . . . unproductive through lack of complete factory and field cooperation.

POWER TAKE-OFF

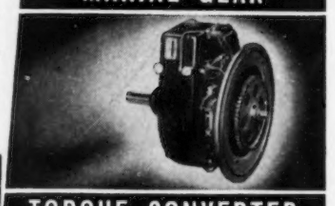


HEAVY DUTY CLUTCH



MACHINE TOOL CLUTCH

MARINE GEAR



TORQUE CONVERTER

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH CO. • 1370 RACINE ST. • RACINE, WIS.

type, providing 61,600 sq. ft. of factory floor space.

Standard Oil Co. of Ohio is starting a new chemical laboratory at its No. 2 works in Cleveland. Manufacturers' Brush Co. is building a one-story plant addition 81 x 136 ft.

At Youngstown, Youngstown Steel Door Co. is adding 10,000 sq. ft. of plant floor space.

A second addition to its foundry will be built by I. Schumann & Co., Cleveland. About 6000 sq. ft. of floor space will be provided and some additional equipment will be necessary.

Lake Erie Chemical Co., Cleveland, manufacturer of ordnance material, has embarked upon an expansion program which includes a one-story addition.

Davey Compressor Co., Kent, Ohio, reports a large order backlog resulting from the high rate of activity in the construction field. Direct buying by the government has also benefited the company, which is producing at capacity.

Clark Controller Co., Cleveland, is expanding again with a $10,000 addition to its facilities. The company holds a large order backlog.

Granite City Adds New 90-In. Hot Strip Mill

• • • Granite City Steel Co., Granite City, Ill., is installing a new 90-in. hot strip mill to be ready for operation late in January. This mill, the company's fifth, is being financed by a $350,000 bank loan.

American Welding & Mfg. Will Expand Force Jan. 1

Warren, Ohio

• • • Increase of 60 to 70 men in the skilled and semi-skilled force of the American Welding & Mfg. Co., with a $100,000 plant addition to handle increases in both defense and general busines, is to be made about Jan. 1. H. J. Kaighin, president, says the company has orders for long-time operation.

The American Welding Co. was organized in 1918. Its general line includes clutch drums, welded rings for locomotives and trucks, gear blanks, oil well equipment, and parts for motors and generators.

Mesta Machine To Build Gun Tube Plant

Washington

• • • **The War Department** has awarded a contract on a fixed-fee basis to the Mesta Machine Co., for the equipping of a gun tube plant at West Homestead, Pa., the company to construct and own the building, while the title to the equipment, to cost about $1,680,000 will remain with the government.

Booklet On "Grinding and Cutting Facts" By Sun Oil

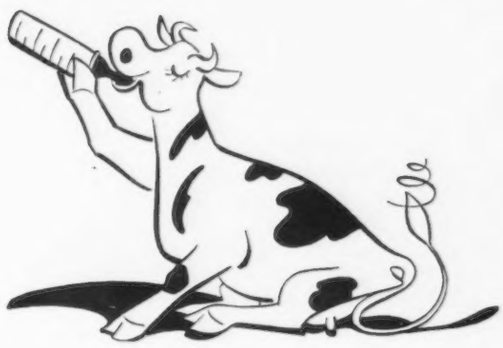
• • • **A 60-page booklet,** "Grinding and Cutting Facts," illustrating and describing 46 modern machine tools and including machining data on latest lathes, milling machines, hobbers, drillers and grinders, has been issued by Sun Oil Co. The booklet, which may be obtained from Sun Oil Co., Dept. No. 6, Philadelphia, also devotes several pages to other metal working operations such as pipethreading, cold rolling, quenching and tempering, and metal cleaning.

Lectures On Metallurgical Inspection and Testing

• • • **A series of** educational lectures on "Metallurgical Inspection and Testing" will be staged during November and December by the Detroit Chapter of the American Society for Metals in the Chemical Lecture Room of the University of Detroit.

The schedule of lectures began on Nov. 7 with L. L. Ferrall, chief metallurgist, Rotary Electric Steel Co., speaking on "The Manufacture of Steel and Steel Mill Inspection." Other lectures were scheduled as follows: "Mechanical Testing" (Tensile properties, testing methods) by H. H. Zurburg, physicist, Chrysler Engineering Laboratories, Tuesday, Nov. 12; "Mechanical Testing" (testing equipment) by J. L. McCloud, metallurgist, Ford Motor Co., Thursday, Nov. 14; "Mechanical Testing (Hardness and Impact)" by W. E. Jominy, research metallurgist, General Motors Research Corp., Nov. 19; "Brass and Bronze (Manufacture, Fabrication, Testing)" by Prof. C. Upthegrove,

FEED A COW ON HER OWN MILK?



How long would she last?

And yet that is exactly what this country will be doing if we try to live on our own Defense Program.

The money that pays for our Defense Program is money that we put into it. All we can possibly get out of it is just a small share of what we put in.

Equipment for the Army and Navy adds nothing to wealth. It cannot be sold on the market like shoes or refrigerators. It is purely a necessary added expense which must be shared by every tax payer in these United States.

Therefore—let's buy as economically as we can. Let's keep National Defense Production costs at a minimum. We are not sellers—we are buyers! And as buyers, let's get the most we can for our money. This can be done by maximum use of existing facilities, economy in materials and effective productivity of men and management.

Meanwhile, let's earn our regular incomes by maintaining our regular business of supplying the normal wants of the people. This will give our cow the "three square meals a day" she needs to produce the milk *we* need for National Defense.

Geo. P. Trundle Jr.

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

General Offices

CLEVELAND • BULKLEY BUILDING

CHICAGO
City National Bank Building
208 South La Salle Street

NEW YORK
Graybar Building
420 Lexington Avenue

University of Michigan, Nov. 26; "Aluminum (Manufacture, Fabrication, Testing)," speaker to be announced, Nov. 28; "Castings—Steel (Manufacture and Testing)" by J. D. Corfield, vice-president, Michigan Steel Castings Co., Dec. 3; "Castings—Gray Iron—Malleable Iron (Manufacture and Testing)" by Prof. Richard Schneidewind, University of Michigan, Thursday, Dec. 5; "Macroscopic Examination (Forgings, Flow Lines, Defects)" by L. A. Danse, metallurgist, Cadillac Motor Car Co., Tuesday, Dec. 10; and "Government Specifications" by an Ordnance officer who name is to be announced, Dec. 12.

This course is designed especially for government inspectors now in the Detroit district with Army, Navy ordnance departments, Air Corps Quartermaster Corps and all manufacturers of government materials. There will be no admission or registration fee. An employment card, badge or other suitable identification is the only entrance requirement.

New Steel Output Record In October of 6,461,898 Tons

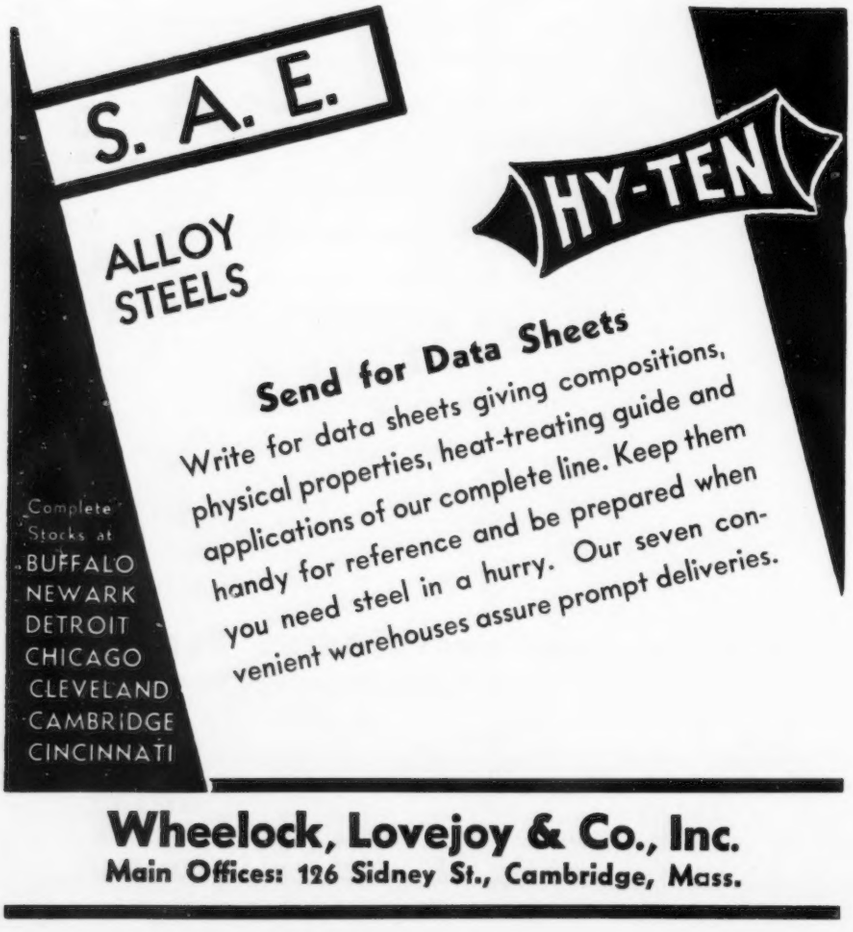
• • • **A new record** for monthly production of open hearth and bessemer steel ingots was established during October, when output totaled 6,461,898 net tons, according to monthly figures of the American Iron and Steel Institute.

The October total was nearly 10 per cent above September when 5,895,232 net tons was produced, and exceeded by more than 5 per cent the previous record of 6,147,783 net tons produced in November 1939. In October, 1939, 6,080,177 net tons was produced.

During the month just closed, the steel industry operated at an average of 96.10 per cent of capacity, which compares with operating rates of 90.75 per cent in September and 89.75 per cent in October, 1939. In November of last year when the previous peak of tonnage was reported, the industry operated at 93.71 per cent of capacity.

An average of 1,458,668 net tons of ingots was produced per week during October of this year, as against average weekly output of 1,377,391 tons in September and 1,372,500 tons in October of last year.

1940	Reported Production (Net Tons) Open-Hearth	Bessemer	Calculated Production All Companies Monthly	Weekly	Number of Weeks	Per Cent of Capacity
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	62.04
May	4,489,665	258,709	4,841,403	1,092,867	4.43	72.00
June	5,122,390	304,381	5,532,910	1,289,723	4.29	84.97
2 nd Quarter	13,333,319	739,425	14,349,019	1,102,922	13.01	72.66
1st 6 Months	26,702,604	1,422,225	28,678,124	1,102,581	26.01	72.64
July	5,165,672	322,302	5,595,070	1,265,853	4.42	83.40
August	5,548,397	369,674	6,033,037	1,361,859	4.43	89.72
September	5,417,784	365,188	5,895,232	1,377,391	4.28	90.75
3rd Quarter	16 131,853	1,057,224	17,523,339	1,334,603	13.13	87.93
9 Months	42,834,457	2,479,449	46,201,463	1,180,416	39.14	77.77
October	5,930,952	408,053	6,461,898	1,458,668	4.43	96.10


S. A. E.
ALLOY STEELS
HY-TEN
Send for Data Sheets
Write for data sheets giving compositions, physical properties, heat-treating guide and applications of our complete line. Keep them handy for reference and be prepared when you need steel in a hurry. Our seven convenient warehouses assure prompt deliveries.
Complete Stocks at
BUFFALO
NEWARK
DETROIT
CHICAGO
CLEVELAND
CAMBRIDGE
CINCINNATI

Wheelock, Lovejoy & Co., Inc.
Main Offices: 126 Sidney St., Cambridge, Mass.

Gary Payroll Above Indianapolis Total

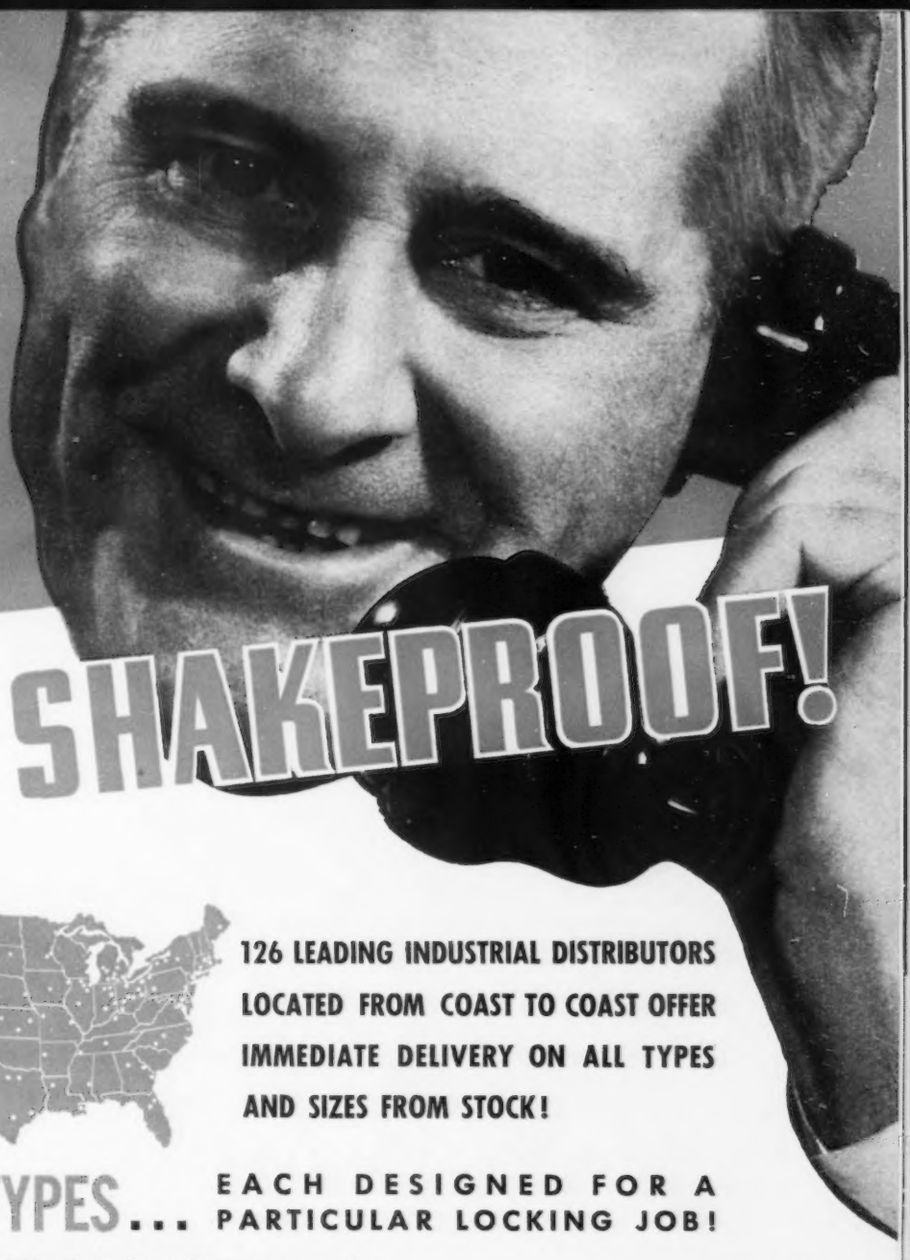
Gary, Ind.

• • • **Gary (steel) led all** Indiana cities in industrial payrolls during September. With 30,064 employed, weekly payroll amounted to $1,010,513 in excess of Indianapolis, a much larger city.

Signal Electric to Occupy New Plant Addition

Menominee, Mich.

• • • **Signal Electric Mfg. Co.** will occupy within 90 days a new plant addition, which will provide 20,000 more sq. ft. of floor space. This new wing is similar to that added in 1937.



Need Lock Washers in a hurry?

'phone for SHAKEPROOF!

EXTERNAL—for U. S. Standard nuts and large head machine screws, such as binder, oven and washer head types.

INTERNAL—for S. A. E. nuts and small head machine screws, such as round, hexagon and fillister head types.

COUNTERSUNK—for all countersunk machine screws, such as flat and oval head types.

EXTERNAL-INTERNAL—for applications where a large bearing surface is necessary.

126 LEADING INDUSTRIAL DISTRIBUTORS LOCATED FROM COAST TO COAST OFFER IMMEDIATE DELIVERY ON ALL TYPES AND SIZES FROM STOCK!

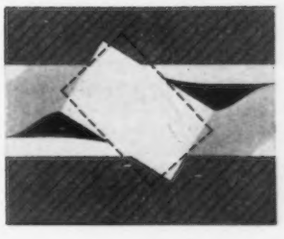
FOUR TYPES... EACH DESIGNED FOR A PARTICULAR LOCKING JOB!

A leading Industrial Distributor located near you is ready to deliver from stock the exact sizes and types of Shakeproof Lock Washers that you need to give your product thorough protection against vibration. The powerful locking action of the exclusive tapered-twisted tooth design plus the fact that there are four separate types—each one engineered to lock a particular kind of screw or nut fastening—assures greater locking efficiency. Don't merely ask for lock washers—specify Shakeproof!

FREE SAMPLE RING!

Ask your distributor's salesman for a free test ring of Shakeproof Lock Washers. Test their locking power in your own shop—you'll quickly realize how they can help improve the performance of your product!

If you don't know who handles Shakeproof in your city, write us and we will send you the name of our nearest distributor immediately!



Actually Locks Tighter Under Vibration!

When vibration attacks a nut or screw locked with Shakeproof, the tapered-twisted teeth dig deeply into both surfaces, setting up a powerful lock. As vibration increases, the teeth dig deeper—never allowing any loosening action even to start!

SHAKEPROOF LOCK WASHER CO.

Distributor of Shakeproof Products Manufactured by
ILLINOIS TOOL WORKS
2511 North Keeler Avenue, Chicago, Illinois
Plants at Chicago and Elgin, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

Copyright 1940 Illinois Tool Works

"Fastening

SHAKEPROOF

Headquarters"

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

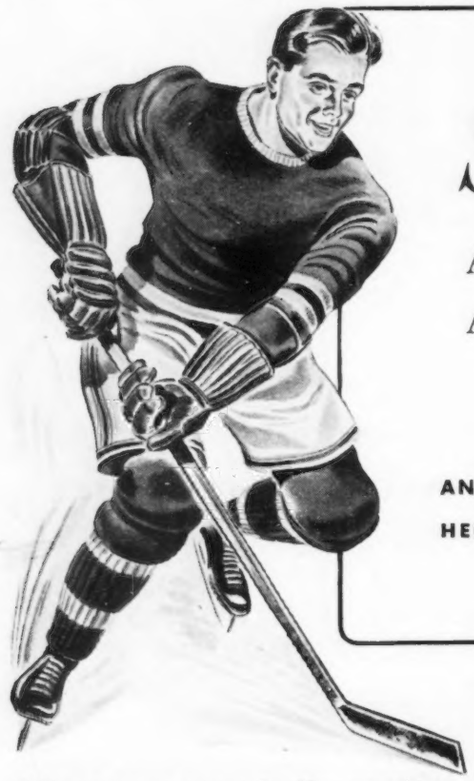
Thread-Cutting Screws . . . Locking Screws . . . Spring Washers . . . Special Stampings

Gage Sales Soar On Defense, Export Orders

• • • **Largely as a result** of national defense and foreign war orders, the gage industry this year has shown a phenomenal increase in business. Reports from individual manufacturers show business gains ranging from 100 to 600 per cent over last year. Prime reason is that the production of war materials to government specifications requires accurate gaging, with the result that companies who formerly were working to wider tolerances are now finding it necessary to acquire precision inspection tools. Particularly is this true of the myriad of small shops throughout the country which are coming into the national defense picture as sub-contractors.

This development has taxed the production resources of producers of many forms of gages, particularly ring, plug, and thread gages. As a result, there is a tendency among purchasers toward specifying longer-lived gages, such as the chrome plated and cemented carbide types on the theory that their effective life, despite their somewhat higher cost, will not only provide long term economies but also will relieve somewhat the strain on gage production capacity.

Thus, Lincoln Park Tool & Gage Co. is currently running 100 per cent ahead of last year, with the company's Carboloy gages at approximately 225 per cent of 1939 levels. The Taft-Peirce Mfg. Co. also reports more than a doubling of 1939 gage production volume, chrome plated and carbide types showing a somewhat higher proportion of the total volume than last year. Detroit Tap & Tool Co. reports demand for thread plug and ring gages 600 per cent ahead of last year and is just completing a plant addition, doubling production capacity.



Speed—

AS MUCH OR AS LITTLE AS YOU NEED

•

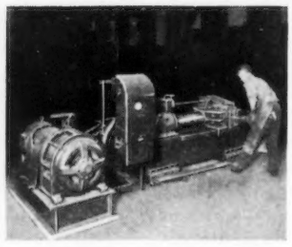
AN ADVANTAGE OF A-E-CO HELE-SHAW FLUID POWER

IF you've ever compared the speed of a hydraulically driven face grinder table, taking a light finishing cut, with the movement of a slowly closing hydraulically operated press, then you will know what Hele-Shaw Fluid Power is capable of in speed variation.

With Fluid Power you can race . . . or creep so slowly that movement of the driven mechanism is unnoticeable.

You can select *any* speed within the limits of the Hele-Shaw Pump by simply pulling a lever or turning a wheel. It's that easy. Speed variation is important although it is only one of many benefits of Fluid Power operation. Here's pressure — up to 3000 pounds per square inch . . . sensitive control of movements of heavy machine parts, mechanical simplicity, dependability, ease of application, manual or automatic control over one or over many steps in a complete cycle of operation.

And you're likely to find Fluid Power saves operating and maintenance costs.



EASE of CONTROLLING high pressure makes fluid power ideal for bulldozers. The Hele-Shaw Pump may be adjusted for a wide variation in strokes per minute.

We haven't told you the whole story because that would require much more space than this page. We'll continue when we've heard your problem. Call us up or drop us a line and we'll be glad to help you to build-in or design-in Hele-Shaw Fluid Power (oil under pressure for driving machines).

A-E-CO HELE-SHAW *Fluid* POWER

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Other A-E-CO Products: Lo-Hed Hoists, Taylor Stokers, Marine Deck Auxiliaries.

TNEC Steel Monograph Estimated At 35 Pages

Washington

• • • **There is to be a** TNEC monograph on steel after all. But it will be an abbreviated job. As compared with monographs of 300 to 450 and more pages on lesser industries, steel will get perhaps only about 35 pages and they will be chiefly of factual rather than subject matter. The monograph will be entitled "Price Discrimination In Steel."

For a while it was doubted that there would be any monograph on steel. Dr. M. G. de Chazeau, economist, who was assigned to the Department of Justice and prepared steel data for the TNEC, was to have prepared the monograph. He was called away to other fields. Finally, however, arrangements were made to have a statistical study made. It has been completed and was done by John M. Blair, Bureau of Labor Statistics economist, and Arthur Reeside, formerly of the Department of Justice TNEC statistical division.

STOP YOUR BOLTS, NUTS AND SCREWS FROM LOOSENING *with* EVERLOCK WASHERS

U. S. PAT. NO. 1775705

Washer Tongue Detail

YOU can avoid the costly annoyance of loosened parts by using EVERLOCK WASHERS in your assemblies . . . The powerful spring tension of every EVERLOCK WASHER tongue coupled with the bite of its teeth, does the job more thoroughly than other types of fasteners . . . Pictured is an enlarged EVERLOCK tongue and a few of the different types that are used by the millions on a vast variety of products . . . Service calls due to loosened nuts, bolts and screws on equipment where EVERLOCK WASHERS are used, is unknown . . . There's an EVERLOCK WASHER of the correct type and size for every purpose.

Immediate Deliveries

OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

THOMPSON-BREMER & CO. 1640 W. HUBBARD ST., CHICAGO, ILL.

PRINTED IN U.S.A.

UNICHROME* RACK COATING-W

"FOUR to ONE BETTER

THAN THE BEST MATERIAL PREVIOUSLY USED!"

THIS statement made by a recent "Unichrome"* Rack Coating-W user is typical of the enthusiastic praise earned by "Unichrome"* Rack Coating-W wherever used.

We are sure you will agree that this new rack-coating material is indeed remarkable when you consider its unequalled *combination* of advantages:

1. Withstands boiling cleaners and all plating solutions.
2. Tough—withstands wear and tear of handling.
3. Contains no ingredients harmful to plating solutions.
4. Cuts costs—reduces frequency of re-coatings.
5. Easy to apply—"dip and force dry" method.
6. Light in color—easy to see how well the rack is covered.
7. Any part of rack can be recoated without recoating entire rack.

Write for Bulletin 15
Containing Complete Information

Platers without rack coating facilities may have their racks coated with "Unichrome"* Rack Coating-W by Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Ill.; Belke Manufacturing Company, 947 North Cicero Avenue, Chicago, Ill.; or Lea Manufacturing Co., of Waterbury, Conn.

UNITED CHROMIUM
INCORPORATED

51 East 42nd Street, New York, N. Y.
2751 E. Jefferson Ave., Detroit, Mich.
Waterbury, Conn.

*Trade Mark
Reg. U.S. Pat. Off.

Mullins Division To Buy Shell Making Equipment

Warren, Ohio

• • • **Filling a large** government contract for shell cases will require more than $500,000 in new equipment at the plant of Youngstown Pressed Steel Co., division of Mullins Mfg. Co. New presses, annealing equipment, washers, trimmers and other machinery will be required. It is understood a large part of the equipment is already on order. The company plans to make use of a long building formerly housing production lines which were given up some time ago. It is understood the new government contract calls for at least 2,000,000 shell cases of the 105 mm. and 3-in. type. Government financing has been approved.

The contract is one of the largest of its type to be placed recently in this vicinity. However, at least half a dozen other large awards are believed imminent, four being at Cleveland, Ohio.

Transformer Requirements Lift Sharon Plant Activity

Sharon, Pa.

• • • **The Westinghouse** Electric & Mfg. Co.'s plant here devoted exclusively to transformer manufacture, has increased production substantially to meet transformer requirements under the government's national defense program.

At present 500 distribution and instrument transformers are under construction for Navy shipbuilding. Among the major orders affecting national defense and being built here by Westinghouse are three huge electric furnace transformers, one of which will supply current to an electric furnace in a steel mill which is turning out alloy for airplane parts.

Brazil's 6-Month Pig Iron Output 77,377 Tons

Washington

• • • **Brazil's output** of pig iron is reported to the Commerce Department at 77,377 tons from January through June, 1939, as compared with 86,655 tons the first six months this year. Steel production increased from 62,022 to 66,412 tons while production of rolled goods increased from 47,503 to 67,305 tons.

ALMOST—

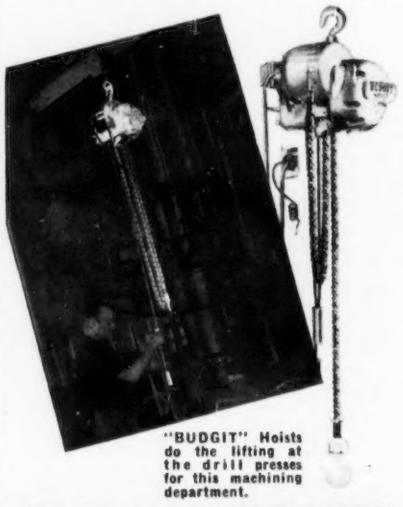
"by your bootstraps"

Lifting burdens too heavy for muscles becomes magically easy with "Budgit" Hoists. Their effortless lifting is fast, safe, and economical.

"Budgit" Hoists are portable electric hoists that you simply hang up, plug into any electric socket and use . . . Installed at all places where lifting is done manually or with chain blocks they speed the work, reduce waiting time of men and machines and promote efficiency.

"Budgit" Hoists come in sizes to lift loads up to 250, 500, 1000, and 2000 pounds with speeds to suit today's tempo . . . You can afford "Budgits"! . . . Prices start at $119.

Send for catalog containing complete information, also, "Time Saving Calculator" that shows savings they earn.



"BUDGIT" Hoists do the lifting at the drill presses for this machining department.

'BUDGIT' HOISTS

SHAW-BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
402 BROADWAY • MUSKEGON, MICHIGAN

•

Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . **Send all your crane and hoist inquiries to Shaw-Box!**

Lathe Builders Adopt Standards of Accuracy

• • • **At the recent annual** meeting of the National Tool Builders Association it was revealed that the lathe group had adopted a set of "Standards of Accuracy for Engine Lathes" and during the past summer had presented the standard to the American Standards Association for adoption. Practically all lathe manufacturers in the United States have accepted the standards, which provide tolerances of error on all major functioning parts of the lathe, from alinement of the bed to runout of the spindle nose and backlash in the feed screws. Three recommended standards have been provided covering toolroom lathes and engine lathes from 12 to 18 in. swing and from 20 to 36 in. swing. Early acceptance by the A.S.A. is expected. Meanwhile, the standards have already been put into effect by the lathe manufacturers.

Window Screen Output In 1939 Exceeds 1937 Total

Washington

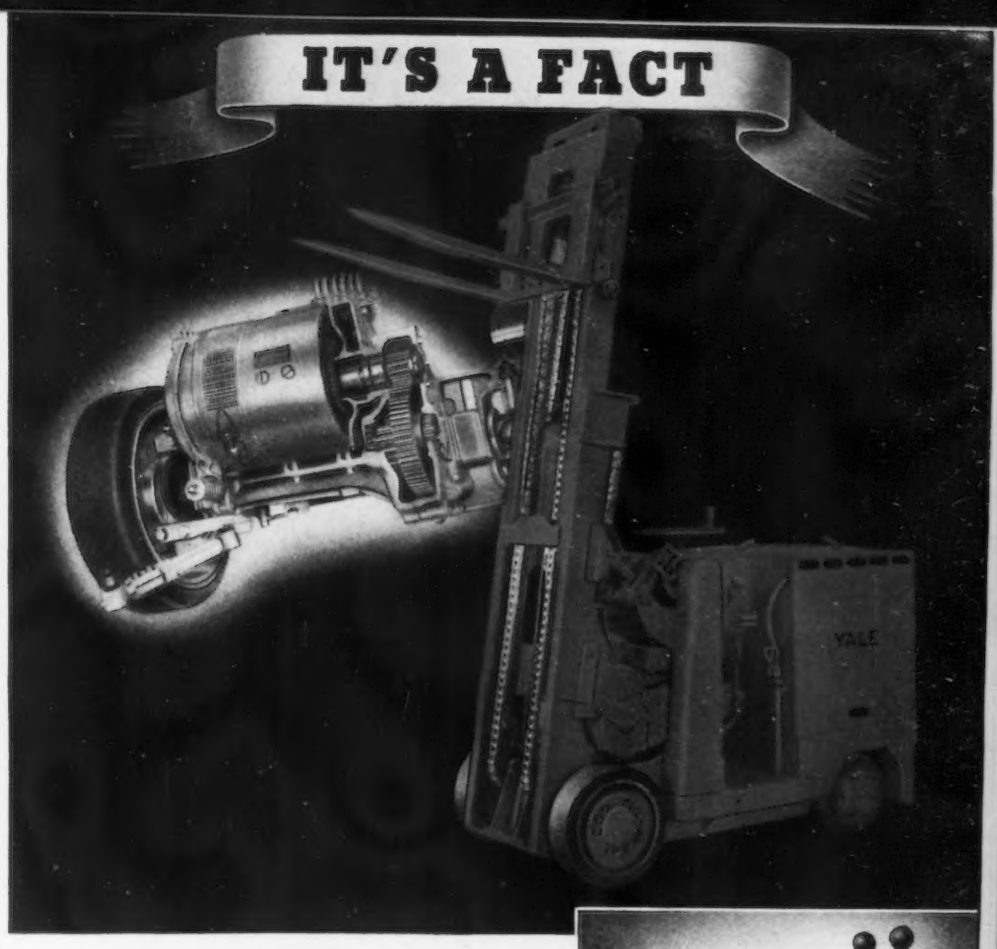
• • • **Manufacturers** of window and door screens and weather strip, according to figures compiled in the 1939 Census of Manufactures, reported that value of products increased from $14,747,-702 in 1937 to $15,223,769 in 1939. The number of wage earners remained virtually unchanged. Total employee wages, however, declined from $3,034,418 to $2,983,-580 while the number of establishments increased to 162 from the 144 figure reported for 1937.

Waste Material Group Backs Price Control

Cleveland

• • • **Cooperation** was promised to the government on behalf of the waste material industry by Harry S. Goldstein, president of the National Association of Waste Material Dealers Inc., in an address here Oct. 28 at the midyear convention of the association.

"The government does not want and is prepared to prevent any runaway market conditions," he continued. "It will not stand for it and will curb the skyrocketing of prices. The government is trying to avoid inflationary trends and all the evil consequences that usually follow."



YALE ELECTRIC TRUCKS *are better!*

BETTER—FASTER—MORE ECONOMICAL. Those four words tell the story of Yale Electric Industrial Trucks—and Yale Trucks apply those words to handling operations.

No matter what your handling problem, there's a money-saving Yale Truck for the job. The complete line includes low-lift and high-lift platform, fork, ram and crane models in capacities for every need.

In addition, basic underlying features make Yale Trucks do superior work longer. Here are a few of them:

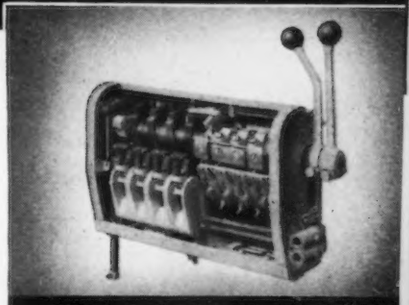
1. Drive Unit . . . uses straight spur, or combination of bevel and spur gears. Gears are drop-forged, chrome-nickel, heat-treated steel, cadmium plated for longer life. For smooth operation, they are mounted on roller bearings and move in an oil bath. Here's *extra* power 24 hours a day!

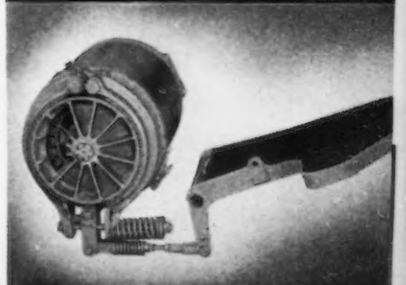
2. Cam-O-Tactor Controller . . . Positive mechanical cam and roller action makes and breaks contacts, guards against welding of contact points. Permanent alnico blow-out magnets instantly quench arc—lengthen contactor life. This improved simplified controller is safer, trouble-free—means fewer costly repairs and lost hours.

3. Driving Brake . . . mounted directly on motor end head, operates on a high-speed cast-iron drum and transmits the braking action to both driving wheels via a train of gears and differential. Regardless of operating conditions, it brakes the power at the source—gives operator the added safety of simultaneous braking on both drive wheels.

4. Drive Wheels . . . are electrically welded disc steel type, mounted to the driving flange by specially hardened steel dowel bolts. Wheels can be easily demounted without exposing the sealed bearings or disturbing alignment. Servicing time reduced to a minimum!

There is a Yale Electric Truck for your handling job. The Yale representative (listed in the Classified Directory) will be glad to tell you about it. Or write to us direct.


CAM-O-TACTOR CONTRO


DRIVING BRAKE

DRIVE WHEEL

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

YALE

Makers of Yale Hand Chain Hoists, Electric Hoists, Electric Industrial Trucks, Hand Lift Trucks and Skid Platforms.

Chicago Area Defense Contracts Top $500,000,000

Chicago

• • • **Through Sept. 30,** defense contracts awarded to firms in the greater Chicago district totaled more than $500,000,000. More than 80 per cent of the dollar volume went for such items as engines, trucks, tractors, ammunition components, etc., for which plants in this district are best equipped. Largest individual order here went to General Motors Corp., a total of $81,000,000 for machine guns and plant equipment to produce them. Defense orders for trucks and tractors comprise about the same dollar volume. Defense orders in this district fell off in the first three weeks of October, about $30,000,000 being placed, mostly for ammunition components, largest single order for $11,000,000 of chemicals and explosives.

Orders Awarded For Shell-Loading Plants

Washington

• • • **Contracts totaling $84,076,384 for construction and operation of a shell loading plant near Burlington, Iowa; another at Union Center, Ind., and a TNT plant at Weldon Springs, Mo., were announced last week by the War Department.**

A $34,451,384 contract awarded Day & Zimmermann, Inc., Philadelphia, provides for the design, construction, operation and supervision of a shell loading plant near Burlington, Iowa, for which the Quartermaster Corps will purchase 20,000 acres of land.

The second shell loading plant, to be constructed at Union Center, Ind., by the Bates & Rogers Construction Co., Chicago, on a cost-plus-fixed-fee contract totaling $11,500,000, will be operated by Todd & Brown, Inc., of New York City, recipients of a $26,800,000 cost-plus-fixed-fee contract.

The War Department's latest award for a TNT and DNT plant went to the Fraser-Brace Engineering Co., Inc., New York City. To be located at Weldon Springs, Mo., the new plant will cost $11,325,000 and will be operated by the Atlas Powder Co., of Wilmington, Del.

$4,294,789 Airplane Plane Contract Given To Vultee

Washington

• • • **A $4,294,789** contract for plant expansion has been awarded the Vultee Aircraft Inc., Downey, Cal., by the War Department under the provisions of the emergency plant facility contract. Under this arrangement, the company supplies the funds, the government repays the cost within five years, after which the firm can purchase the facilities at cost.

$75,313,000 Plane Contract To Consolidated Aircraft

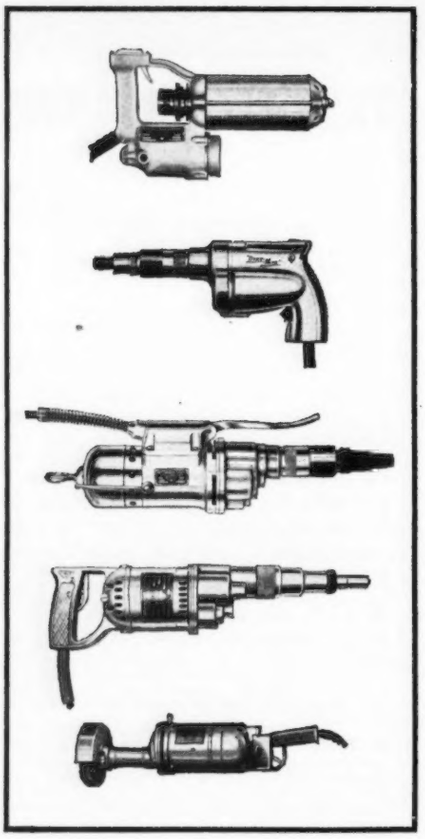
Washington

• • • **The Navy Department** last week awarded a $75,313,000 contract to Consolidated Aircraft Corp., San Diego, Cal., for airplanes.

POWER
TO SPEED PRODUCTION

You're stepping up production schedules . . . adding men . . . *be sure you add enough portable electric tools.* Now more than ever, skilled hands must *not* be burdened with work a machine can do . . . must *not* be slowed down for want of adequate power tool assistance.

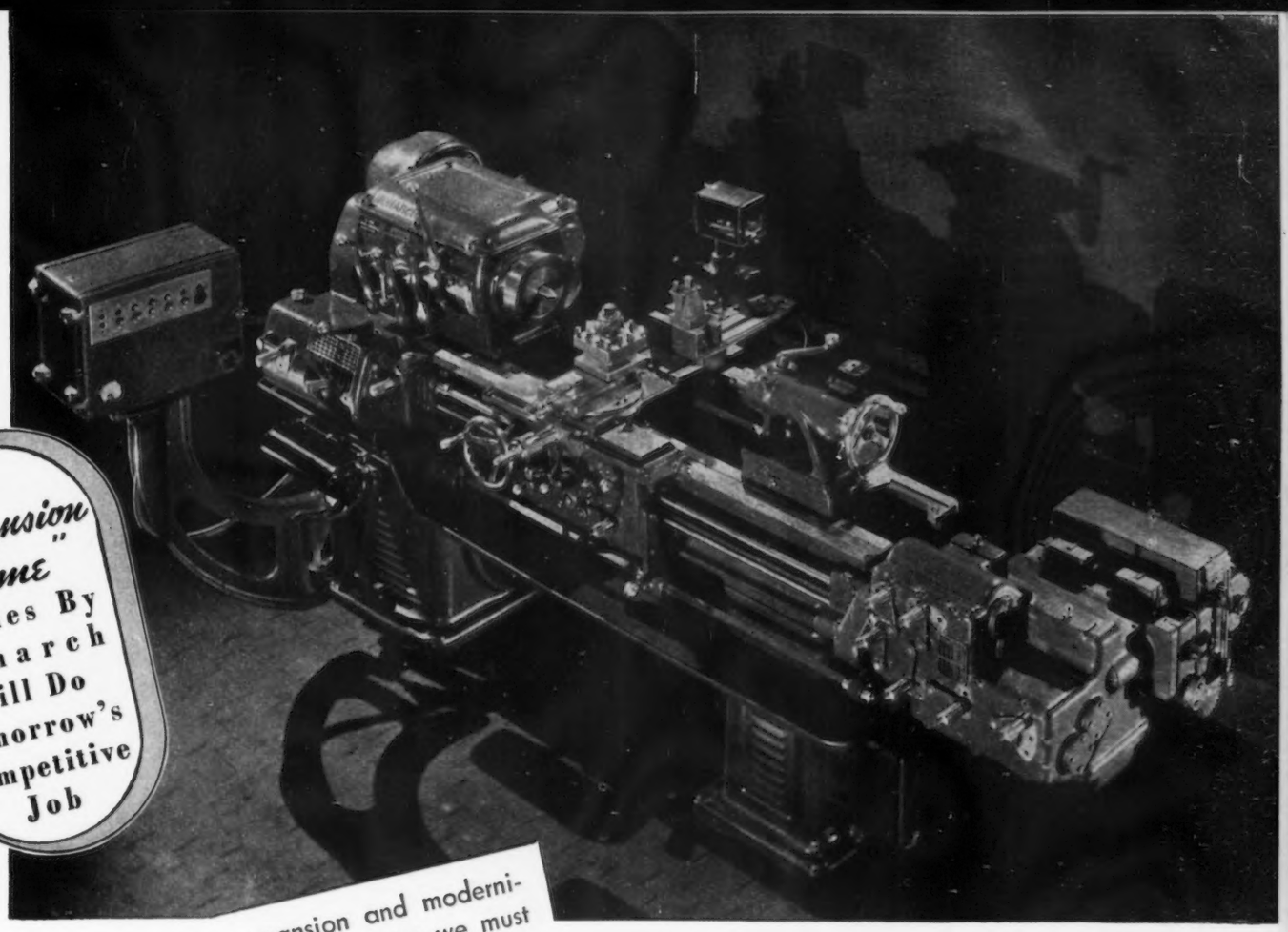
Your Millers Falls distributor can help you select the *right* tools for your needs from the broad Millers Falls line. Here's a wide range of kinds and capacities, with stands and accessories to fill every requirement. Each is made to Millers Falls high standards of quality—up-to-the-minute in fatigue-beating, cost-cutting, time-saving features. *They'll pay their way.*



LET US ARRANGE A FREE TRIAL ON YOUR OWN WORK. NO OBLIGATION.

MILLERS FALLS COMPANY
GREENFIELD, MASSACHUSETTS

MILLERS FALLS TOOLS SINCE 1868



"Expansion Time"
Lathes By Monarch Will Do Tomorrow's Competitive Job

INDUSTRIAL expansion and modernization NOW . . . is the price we must pay for tomorrow's economic security. Post war markets will find our overseas competitors equipped to fight for world trade on a war-born efficiency level, far higher than we have known before.

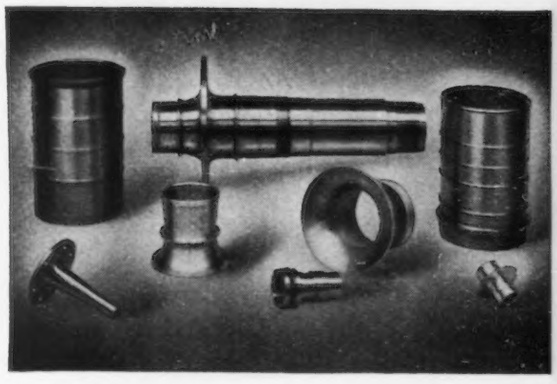
MONARCH, through constant research and development, has planned and built lathes designed to meet tomorrow's production requirements. For example . . . the MONARCH-KELLER Form Turning Lathes have revolutionized the making of intricate aircraft engine parts . . . here and abroad . . . parts such as those shown in the panel at right.

For years, Monarch machines have led in the production of intricate tools and parts, in the world's best shops. The Monarch Machine Tool Co., Sidney, O.

HERE'S YOUR

DOWN PAYMENT

ON YOUR FUTURE SECURITY!



MONARCH LATHES

Tool-up with Monarch!

Government Awards . . .

Government awards for week ended Nov. 2 as listed by Public Contracts Division, Department of Labor:

Iron and Steel Products:

Aircraft Hardware Mfg. Co., Inc., New York; bolts, $16,457.

Allegheny Ludlum Steel Corp., Watervliet, N. Y.; steel rods, $144,866.

American Steel Foundries, Chicago; volute springs, $21,250.

American Steel & Wire Co., Cleveland; steel bars and rods, $13,354.

American Steel & Wire Co. of N. J., Philadelphia; steel rods, $13,734.

Animal Trap Co. of America, Lititz, Pa.; coat hooks, $11,900.

Arguto Oilless Bearing Co., Philadelphia; punches and dies, $16,085.

M. Mocoroa Arsuaga, Inc., San Juan, P. R.; iron pipe, $10,931.

Bethlehem Steel Co., Los Angeles, Cal.; reinforcing bars, $13,680.

Bethlehem Steel Co., Cincinnati; sluice liners, $80,060.

Bethlehem Steel Co., Bethlehem, Pa.; forgings, $506,250.

Bethlehem Steel Co., Bethlehem, Pa.; steel rods, $146,362.

Bethlehem Steel Export Corp., New York; reinforcement bars, $71,270.

Boston & Lockport Block Co., New York; Blocks, tackle, $19,804.

Camillus Cutlery Co., New York; pocket knives, $35,849.

Carnegie-Illinois Steel Corp., Washington; steel bars, $64,691.

Carnegie-Illinois Steel Corp., Washington; steel forgings, $777,012.

Carnegie-Illinois Steel Co., Chicago; molybdenum steel, $82,377.

Carnegie-Illinois Steel Corp., Boston; steel, bar, $13,572.

Carnegie-Illinois Steel Corp., Pittsburgh; steel, $11,521.

Carpenter Steel Co., Reading, Pa.; steel rods, $155,873.

Chicago Bridge & Iron Co., Birmingham, Ala.; penstock liners, $38,000.

Christiana Machine Co., Christiana, Pa.; cast iron anchors, $14,908.

Collins Co., Washington; machetes, $21,947.

Columbia Steel Co., Los Angeles; reinforcing bars, $20,283.

Consolidated Steel Corp., Ltd., Los Angeles; inlet pipe, $13,900.

Crescent Tool Co., Jamestown, N. Y.; pliers, $54,528.

Crescent Tool Co., Jamestown, N. Y.; wrenches, $27,436.

Crucible Steel Co. of America, New York; steel sheet, $35,242.

Crucible Steel Co. of America, New York; plates, sheets, $19,669.

Crucible Steel Co. of America, New York; steel, sheet, $12,030.

Crucible Steel Co. of America, New York City; steel rods, $10,010.

Darby Products of Steel Plate Corp., Kansas City; mine cases, $74,304.

De Long Hook & Eye Co., Philadelphia; coat hooks, $16,540.

Doehler Die Casting Co., Pottstown, Pa.; die castings, $40,650.

Duffin Iron Co., Chicago, Ill.; structural steel, $27,252.

Eastern Rolling Mill Co., Baltimore; steel, sheet, $10,112.

Eastern Rolling Mill Co., Baltimore; steel, $11,880.

John Ehrmeyer, t/a Abenell Co., Chicago; selector boxes, $27,994.

Eladio Rodriguez Portela, Rio Piedras, P. R.; steel sheets, $41,415.

Ellicott Machine Corp., Baltimore; Ladder, cutter, $54,820.

Ex-Cell-O Corp., Detroit; drainage tanks, $13,562.

E. W. Ferry Screw Products, Inc., Cleveland, Ohio; bolts, Indefinite.

Fisher-Pierce Co., Neponset, Mass.; fuse covers, $12,818.

Fort Pitt Bedding Co., Pittsburgh; metallic belt links, $419,200.

General Electric Co., Schenectady, N. Y.; howitzers, $92,938.

General Machinery & Supply Co., San Francisco; wrenches, $13,507.

Grabler Mfg. Co., Cleveland; pipe fittings, $41,755.

Harrisburg Steel Corp., Harrisburg, Pa.; separators, $14,200.

Hayes Mfg. Corp., Grand Rapids, Mich.; shells, $21,600.

Hayes Mfg. Corp., Grand Rapids, Mich.; shells, $25,010.

Heintz Mfg. Co., Philadelphia; steel doors, $16,376.

Imperial Brass Mfg. Co., Chicago, Ill.; bender, tube, Indefinite.

Ingersoll-Rand Co., New York; drills, heads, $16,786.

Islands Welding & Supply Co., Ltd., Honolulu, T. H.; box, ammunition, $10,680.

Jenkins Brothers, Bridgeport, Conn.; valves, $15,819.

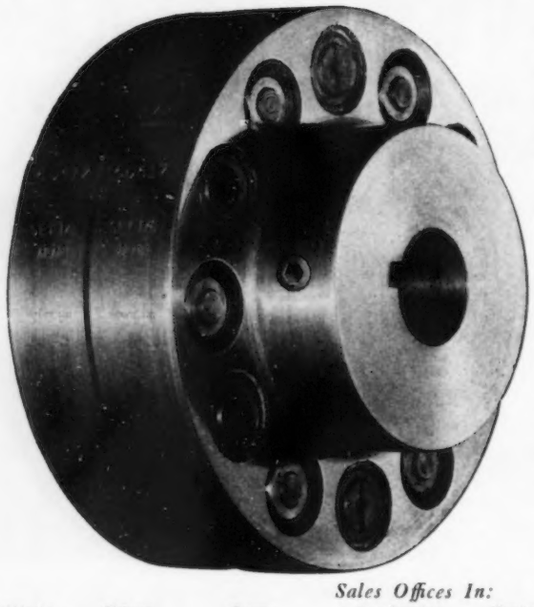
William Jessop & Sons, Inc., Boston, Mass.; steel, $63,758.

Jones & Laughlin Steel Corp., Pittsburgh; steel I-beams, $35,700.

Karp Metal Products Co., Inc., Brooklyn, N. Y.; box, $28,515.

AJAX

FLEXIBLE COUPLINGS



Safeguard Against Production Shutdowns

Ajax rubber bushings and graphite bronze bearings give positive drive . . . resilient flexible protection against unavoidable misalignment . . . free end float . . . dielectric insulation . . . no noise, no backlash . . . no lubrication worries . . . dependable performance in dust and abrasive-laden air. America's largest manufacturers have standardized on Ajax Flexible Couplings. Semi-steel, forged steel, standard and shear pin types are built in complete range of sizes from 1⅛" bore up. Write for data book.

Sales Offices In:

Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Kansas City, Los Angeles, Louisville, Milwaukee, Minneapolis, Montreal, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Salt Lake City, Seattle, Spokane, Stuttgart, Syracuse

AJAX FLEXIBLE COUPLING CO.

MAKERS OF FLEXIBLE COUPLINGS SINCE 1920

137 English Street, Westfield, N. Y.

Karp Metal Products Co., Brooklyn; cabinet assys., $20,461.

Keystone Steel & Wire Co., Peoria, Ill.; wire nails, $16,994.

Kilby Steel Co., Anniston, Ala.; screw posts, $95,268.

Larson Tool & Stamping Co., Attleboro, Mass.; guards, valves, $13,347.

A. Leschens & Sons Rope Co., St. Louis; wire rope, $15,812.

Maclane Hardware Co., New York; misc. supplies, $11,490.

Alexander Milburn Co., Baltimore; torches, $29,203.

Minneapolis-Honeywell Regulator Co., Minneapolis; telescope mounts, $171,200.

George F. Muth Co., Inc., Washington; rules, slide, $10,841.

National Tube Co., Chicago; steel tubings, $15,156.

North American Iron & Steel Co., Inc., Brooklyn, N. Y.; cargo booms, $15,636.

North & Judd Mfg. Co., New Britain, Conn.; loops, slides, $78,678.

Parker Appliance Co., Cleveland; tube bender, $23,999.

Phillips & Davies, Inc., Kenton, Ohio; intake gates, $70,000.

Pittsburgh Screw & Bolt Corp., Pittsburgh; anchor bolts, $85,974.

Pittsburgh Steel Co., Pittsburgh; barbed wire, $44,619.

H. K. Porter, Inc., Everett, Mass.; wire cutters, $25,651.

G. E. Prentice Mfg. Co., New Britain, Conn.; clasps, $28,050.

Pressed Steel Tank Co., West Allis, Wis.; shells, $47,470.

Purolator Products, Inc., Newark, N. J.; filters, $10,392.

Reeves Steel & Mfg. Co., Dover, Ohio; cans and covers, $18,122.

Republic Steel Corp., Chicago; steel, $20,693.

Republic Steel Corp., Massillon, Ohio; steel rods, $11,640.

Richmond Radiator Co., Inc.; Uniontown, Pa.; cast iron anchors, $42,704.

Sheffield Steel Corp., Kansas City; bolts and nuts, $47,124.

Southern Pipe & Casing Co., Azusa, Cal.; steel pipe, $35,889.

Steel Improvement & Forge Co., Cleveland, Ohio; forgings, $17,500.

Struthers Wells-Titusville Corp., Titusville, Pa.; forgings, $127,000.

Templeton, Kenly & Co., Chicago; ratchet jacks, $26,930.

Truscon Steel Co., Los Angeles; reinforcing bars, $10,040.

Union Metal Mfg. Co., Canton, Ohio; pile shells, $27,166.

United-Carr Fastener Corp., Cambridge, Mass.; brass fasteners, $169,214.

United States Electrical Tool Co., Cincinnati; elec. drills, $20,911.

Universal-Cyclops Steel Corp., Bridgeville, Pa.; steel rods, $145,115.

Utica Cutlery Co., Utica, N. Y.; tableware, $25,025.

Veit & Young, Philadelphia; punches and dies, $15,630.

Vulcan Steel Products Co., Brooklyn; fence, $25,576.

A. F. Wagner Iron Works, Milwaukee; grating and hand rail., $14,988.

Weatherhead Co., Cleveland; connector, etc., $21,208.

Youngstown Sheet & Tube Co., Youngstown, Ohio; wire netting, $111,650.

Youngstown Sheet & Tube Co., Youngstown, Ohio; steel, nickel, $27,496.

Non-Ferrous Metals and Alloys:

Aluminum Co. of America, Atlanta, Ga.; aluminum conductor, $12,595.

American Brass Co., Waterbury, Conn.; cartridge cups, $73,950.

American Metal Co., Ltd., New York; lead antimony alloy, $43,350.

Barium Reduction Corp., S. Charleston, W. Va.; strontium peroxide, $103,750.

Bart Laboratories, Belleville, N. J.; mirrors, $84,000.

Crane Co., San Diego, Cal.; brass pipe, $13,625.

Crosby Co., Buffalo, N. Y.; cartridge cases, $1,175,600.

Kennecott Sales Corp., New York; copper ingot, $74,100.

Walter Kidde & Co., Inc., New York; fire extinguisher, $100,290.

Pennsylvania Smelting & Refining Co., Philadelphia; lead antimony alloy, $26,400.

Revere Copper & Brass, Inc., Baltimore; admiralty metal tubes, $21,285.

Scovill Mfg. Co., Waterbury, Conn.; cartridge cups, $32,850.

Awards by Navy Bureau of Supplies and Accounts:

American Tool Works, Cincinnati; drills, radial, $54,082.

Dorsey C. Anderson, Philadelphia; sets, arc welding, electric, $15,000.

Austin-Hastings Co., Inc., Cambridge, Mass.; drills, radial, $17,276.

Bender Body Co., Elyria, Ohio; racks, shelves, dividers, $76,778.

Cincinnati Bickford Tool Co., Cincinnati; drills, radial, $26,424.

Circle Wire & Cable Co., Maspeth, Long Island, N. Y.; cable, electric, $8,727.

Collyer Insulated Wire Co., Pawtucket, R. I.; cable, electric, $5,084.

Crescent Ins. Wire & Cable Co., Trenton, N. J.; cable, electric, $12,958.

General Motors Corp. (Chevrolet Division), Detroit; trucks, motor, $5,713.

Buy "Some Differences"

IF YOU WANT TO REDUCE THE COST OF FORGINGS

The cost of a forging at the point of delivery begins with the piece of steel from which it is fabricated. The cost of a forging at the point of assembly, into your products, depends upon the work that the forging fabricator performed on this piece of steel, how the work was performed, and the type and quality of tools used in doing the work. Different methods of doing the work create differences in forgings. These differences are not confined to permissible variations of what the specifications call for. Some of these differences are tangible and measurable in T & W forgings. Collectively, these differences usually bring reductions in the cost of machining and finishing. It is the presence of these differences in T & W forgings that protects you from excessive costs at the point of assembly. Get a T & W forging engineer to identify some of these differences for your next forging job.

FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY

TRANSUE & WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

HILLSIDE
FLUORSPAR
85% AND OVER IN CALCIUM FLUORIDE · DOES NOT EXCEED 5% IN SILICA · FREE FROM SULPHIDES, LEAD AND ZINC
Steel Manufacturers
Standard Specifications
Shipments from stock
Rail or River
HILLSIDE FLUOR SPAR MINES
38 SOUTH DEARBORN STREET
CHICAGO, ILL.
MINES IN ILLINOIS AND KENTUCKY

PRECISION
SCREENS
INDUSTRIAL
ORNAMENTAL
ANY
METAL
ANY
PERFORATION
● Perforated metal is for a thousand uses, some of which require precision workmanship to accomplish results otherwise impossible.
● Whatever you require in perforated metal, we are here to produce, either the commonplace, the difficult, or the precision. Your inquiries will have our best attention.
The Harrington & King
PERFORATING CO.
5657 FILLMORE ST., CHICAGO
114 LIBERTY ST., NEW YORK

Gladding, McBean & Co., Los Angeles, Cal.; refractories, fire clay, plastic, $24,334.

Gleason Tiebout Glass Co., New York, N. Y.; globes, marine use, $7,671.

A. P. Green Fire Brick Co., Mexico, Mo.; refractories, fire clay, mortar, refractory, $24,545.

Jones & Lamson Machine Co., Springfield, Vt.; lathes, turret, $23,277.

Kopp Glass, Inc., Swissvale, Pa.; globes, marine use; and lenses, $13,215.

Laclede-Christy Clay Products Co., St. Louis; fire brick, $19,140.

Lidgerwood Mfg. Co., Elizabeth, N. J.; winches, double drum, $65,228.

Edward A. Lynch Machinery Co., Philadelphia; machines, drilling and tapping, $5,605.

Lucian Q. Moffitt, Inc., Akron, Ohio; strips, bearing, rubber, $71,589.

James M. Motley & Co., Inc., New York; machine, forging, $18,146.

James M. Motley & Co., Inc., New York; maches, bolt and staybolt threading, $8,636.

Niagara Motors Corp., Dunkirk, N. Y.; forgings, plunger, semi-finished, $28,359.

North American Refractories Co., Cleveland; fire brick, $51,319.

Ohio Injector Co., Wadsworth, Ohio; valves, composition, $37,246.

Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Div., New York; cable, electric, $8,163.

Phelps Dodge Copper Products Corp., New York; pipe, brass, $12,657.

Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.; machines, vertical, miller and profiler, $8,565.

Revere Copper & Brass, Inc., Baltimore Div., Baltimore; tubing, copper, $100,312.

Rockford Machine Tool Co., Rockford, Ill.; shapers, metal, $18,332.

Vitrefrax Corp., Los Angeles; fire brick, $62,563.

Contracts Cleared by National Defense Advisory Commission:

American Car & Foundry Co., Milton, Pa.; tank cars, $679,640.

Auto Ordnance Corp., Bridgeport, Conn.; small arms material, $3,108,854.

Bendix Aviation Corp., Pioneer Instrument Div., Bendix, N. J.; compass assemblies, $963,500.

Bendix Aviation Corp., Pioneer Instrument Div., Bendix, N. J.; indicator and tube assemblies, $3,186,315.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.; small arms material, $1,150,220.

Crown Cork & Seal Co., Baltimore; small arms material, $1,147,030.

Farnsworth Television & Radio Corp., Fort Wayne, Ind.; radio receivers, $652,189.

GMC-Chevrolet Division, Detroit; trucks, with special bodies and equipment, $762,419.

Goodyear Tire & Rubber Co., Akron, Ohio; wheel and brake assemblies, $1,531,331.

Hayes Industries, Inc., Jackson, Mich.; wheel and brake assemblies, $803,720.

Homelite Corp., Port Chester, N. Y.; power unit, $538,640.

International Harvester Co., Chicago; tractors, $631,172.

Lansdowne Steel and Iron Co., Morton, Pa.; ammunition components, $17,283,750.

LeRoi Company, Milwaukee; air compressors, $976,500.

Sperry Gyroscope Co., Brooklyn, N. Y.; indicator and controller assemblies, $9,961,240.

Square D Company, Kollman Instrument Division, Elmhurst, N. Y.; altimeter assemblies, $2,745,985.

Weston Electrical Instrument Co., Newark, N. J.; indicator assemblies, $1,509,420.

Yellow Truck & Coach Mfg. Co., Pontiac, Mich.; truck chassis, $652,828.

Yellow Truck & Coach Mfg. Co., Pontiac, Mich.; trucks, with special bodies and equipment, $1,805,262.

Other Machinery:

Allis-Chalmers Mfg. Co., Milwaukee; tractors, $684,063.
Allis-Chalmers Mfg. Co., Milwaukee; tractors, $512,346.
American Laundry Machinery Co., Cincinnati; laundry equipment, $30,289.
American Tool Works Co., Cincinnati; lathes, $181,116.
E. W. Bliss Co., Brooklyn; bodymakers, $30,605.
Brown & Sharpe Mfg. Co., Providence, R. I.; screw machines, $74,695.
Bucyrus-Erie Co., South Milwaukee, Wis.; crane, $75,970.
Bucyrus-Erie Co., South Milwaukee, Wis.; shovel, $60,317.
Bullard Co., Bridgeport, Conn.; boring mill, $17,633.
Caterpillar Tractor Co., Peoria, Ill.; crane, $11,202.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; milling machines, $10,410.
Clark Equipment Co., Clark Tructractor Div., Battle Creek, Mich.; tractors, $743,457.
Cone Automatic Machine Co., Inc., Windsor, Vt.; screw machines, $20,065.
Consolidated Machine Tool Corp., Rochester, N. Y.; lathes, $487,165.
Ellicott Machine Corp., Baltimore; pump, $18,692.
Galion Iron Works & Mfg. Co., Galion, Ohio; graders, $11,885.
General Motors Corp., Cleveland Diesel Engine Div., New York; engine parts, $16,198.
Guiberson Diesel Engine Co., Dallas, Tex.; diesel engines, $2,933,345.
Harnischfeger Corp., Milwaukee; power shovel, $17,755.
Harnischfeger Corp., Milwaukee; crane, $31,886.
R. L. Harris, Inc., Knoxville, Tenn.; tractors, $27,654.
Harvey Metal Corp., Chicago; machining forgings, $245,030.
Ingersoll-Rand Co., Washington; air compressors, $14,855.
International Harvester Co., Chicago; tractors, $2,305,373.
Jones & Lamson Machine Co., Springfield, Vt.; lathes, $118,606.
Kearney & Trecker Corp., Milwaukee; milling machines, $40,866.
Köehring Co., Milwaukee; paver, $24,013.
Lloyd & Arms, Inc., Philadelphia, Pa.; drilling machines, $16,997.
Lodge & Shipley Machine Tool Co., Cincinnati; lathes, $285,976.
Monarch Machine Tool Co., Sidney, Ohio; lathes, $18,204.
Niles-Bement-Pond Co., Pratt & Whitney Div., Hartford, Conn.; machine, $21,175.
Ohio Locomotive Crane Co., Bucyrus, Ohio; crane, $18,325.
Osgood Co., Marion, Ohio; crane, $10,531.
Paasche Airbrush Co., Inc., Chicago; drying units, $10,217.
Pangborn Corp., Hagerstown, Md.; shot blasting equipment, $12,456.
Peter Pirsch & Sons Co., Kenosha, Wis.; pumping engine, $11,683.
Henry Prentiss & Co., Inc., New York; boring mill, $28,841.
Henry Prentiss & Co., Inc., New York; grinders, $14,588.
Rockford Drilling Machine, Div. of Borg Warner Corp., Rockford, Ill.; clutch parts, $19,711.
Rockford Machine Tool Co., Rockford, Ill.; planer, $22,250.
Simmons Machine Tool Corp., Albany, N. Y.; lathes, $29,880.
Stedfast & Roulston, Inc., Boston; boring mill, $31,706.
Swind Machinery Co., Philadelphia; boring machine, $24,160.
Underwood Elliott Fisher Co., Columbus, Ohio; accounting machines, $31,064.
Universal Crusher Co., Cedar Rapids, Iowa; cradle assemblies, $92,400.
Wallace & Tiernan Co., Inc., Belleville, N. J.; water purification, $95,710.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; machines, $17,000.
York Safe & Lock Co., York, Pa.; cradle assemblies, $66,945.

the practical side of Springmaking — BY DUNBAR

What about WIRE FORMS?

Watch your loops—Nos. 2 and 3 at left are generally less expensive than No. 1.

*

Much care should be used to select proper material—round, square or rolled wire.

*

In specifications, direction of action should be shown.

*

Experience, not formulas, is the best qualification for wire form manufacture.

"Nothing on our mind but Springs"

FOR REAL, COMMON-SENSE HELP, CALL ON

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"

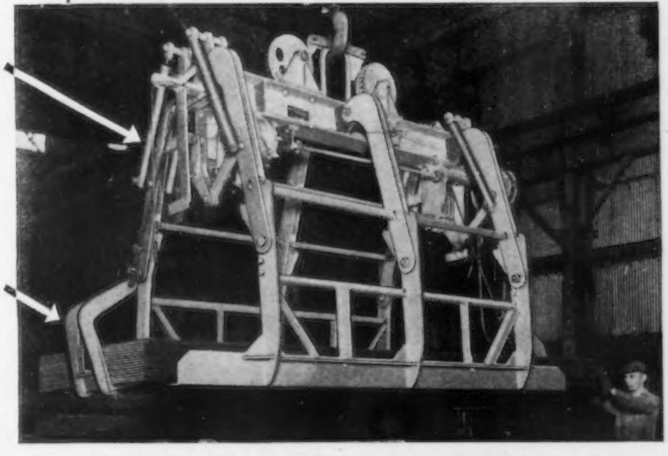
Sheet Steel LIFTING under "one-man" control . . . . . .

Safe lifting with end control. Safe handling of valuable stock. Economical operation and wide utility are the features of C-F SHEET LIFTERS. Get complete information about these 2 to 20 ton capacity units adjustable to handling stock from 12 to 72" wide. Send coupon today.

● This new type C-F SHEET LIFTER is like a giant hand for handling steel sheets in bundles and packs up to 20 tons or larger.

These compression spring cylinders provide *double* the speed in opening the jaws with less effort—in fact with "one-man" control.

These new style, instantly adjustable end hooks prevent sagging on overhanging sheets and stop "bellying" of wide stock in handling.



CULLEN-FRIESTEDT CO.
1303 S. KILBOURN AVE., CHICAGO, ILL.

Please send descriptive literature S.L. 18 to
Firm_____
Title_____
Address_____

No Steel Shortage Seen By Roosevelt

Washington

• • • **The Priorities Board** of the National Defense Advisory Commission discussed the steel situation with the President last week, after which Mr. Roosevelt said he expects no steel ingot shortage when Great Lakes ore shipments are resumed in the spring. The President did not elaborate on his statement but observers said they could not recall that ore shipments on the Great Lakes were a pressing problem in the current ingot supply.

According to reports from the steel industry the amount of ore which will have been brought down by the end of this season will rank with a few previous record levels. This was pointed out in THE IRON AGE (Sept. 12, page 68) in which the possibility of a lake movement of 60,000,000 tons was forecast. At the same time it is said that the quantity of ore on hand at furnaces and docks by the time the lake season opens up in the spring will probably represent the smallest tonnage for some time. Latest information indicates that before the lake season resumes in the spring there may be a few tight situations with regard to ore supplies but they are not expected to be critical nor is the industry as a whole expected to face what could be called a shortage of ore. Usually the lake season closes around Nov. 1 but this year many companies will run their boats as long as possible, hoping to be able to bring down ore to at least Dec. 1. It is pointed out that quite possibly there may be a temporary scarcity in spots but it is not expected to be general.

Mr. Roosevelt, who touched briefly on the activities of the priorities board at his press conference on Friday, said that his advisers are checking on possible bottlenecks in steel. He mentioned in particular steel rolling and stamping facilities in illustrating the problems with which the board is concerning itself. The President did not expand his discussion with the result that it was not clear just what points he had in mind.

Asked about the expansion of steel facilities on the Pacific Coast, the President indicated that progress was being made and that more and different types of steel are being turned out. When requested to elaborate on the subject, he cited plans for the expansion of aluminum (non-ferrous) production on the Columbia River as a healthy sign of industrial expansion for national defense.

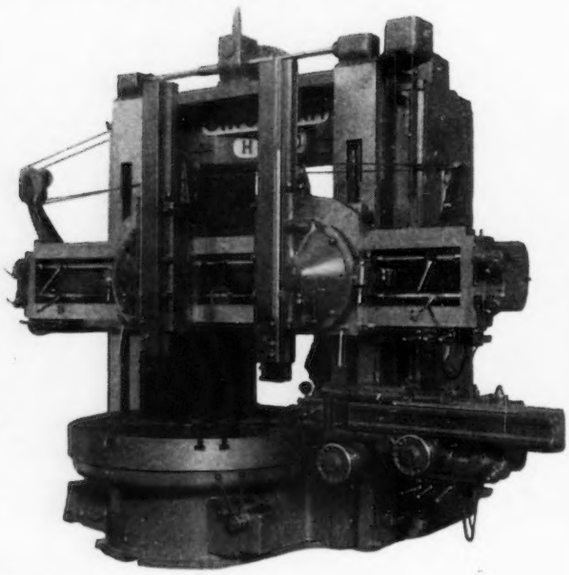
The President also was asked about a report that additional steel facilities are planned near iron ore sources in Minnesota but he replied that he had not heard the report.

Discussing further the functions of the priorities board, the Chief Executive explained that its job is not to take up completed products like aircraft but rather component parts in which short-

Cincinnati

SPIRAL BEVEL GEARED

HYPRO VERTICAL BORING MILLS



Engineered to combine speed, flexibility and ease of control with power, rigidity and accuracy to meet the requirements of today.

Designed for:

1. Centralized Pendant Station Control which provides operation of the entire machine from the operator's position.
2. Individual feed and rapid traverse boxes with independent Rapid Traverse Motors for each head, making it possible to control each head independent of the other.
3. Automatic lubrication provided to all feed boxes, table drive, heads and saddles requiring no attention on the part of the operator.

In these competitive times, you need this kind of equipment. Full particulars sent upon written request.

Sizes—54", 64", 72", 84", 100", 120", 144".

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

Auto Output 519,700 Units In October

Detroit

• • • Establishing a new record for October, motor vehicle production totaled 519,700 cars and trucks for the month, according to an estimate released by the Automobile Manufacturers Association in its monthly publication "Automobile Facts."

Marking the highest production month since June, 1937, factory sales for October were 60 per cent higher than the comparable period of 1939, and 83 per cent above September, 1940.

During the first 10 months of 1940—3,679,760 units were produced, topping last year's figure for the same period by 27 per cent.

age might develop. In the case of the 12,000 additional planes for Great Britain, negotiation for which has been authorized by the board, the members look over manufacturing facilities, the labor supply, and the assembly job involved. They investigate bottlenecks, Mr. Roosevelt added, find out which products may develop shortages and whether an adequate supply of raw materials is assured.

Where the supply of munitions to Great Britain is involved, the President has developed a general "rule of thumb" which, though subject to some exceptions, divides the allocation of munitions on a 50-50 basis whereby Great Britain will receive half of the domestic supply. Mr. Roosevelt indicated that heretofore the ratio has been on a 55-45 basis with the United States taking the greater share.

During the course of the President's press conference he was reminded by one newsman that aircraft company officials in Buffalo, during Mr. Roosevelt's recent campaign trip, were impressed with the Chief Executive's questions which, it was said, indicated a broad knowledge of problems involved in aircraft expansion.

Leaning back in his chair, Mr. Roosevelt said he could not qualify as an expert but that he had concerned himself with the problems of industrial output as early as 1913.

Monsanto Chemical Board Approves Pension Plan

• • • A pension plan covering employees and officers of Monsanto Chemical Co. will be voted upon by stockholders at a special meeting Dec. 20, Edgar M. Queeny, president, has announced. The board of directors has approved the plan subject to approval by the stockholders.

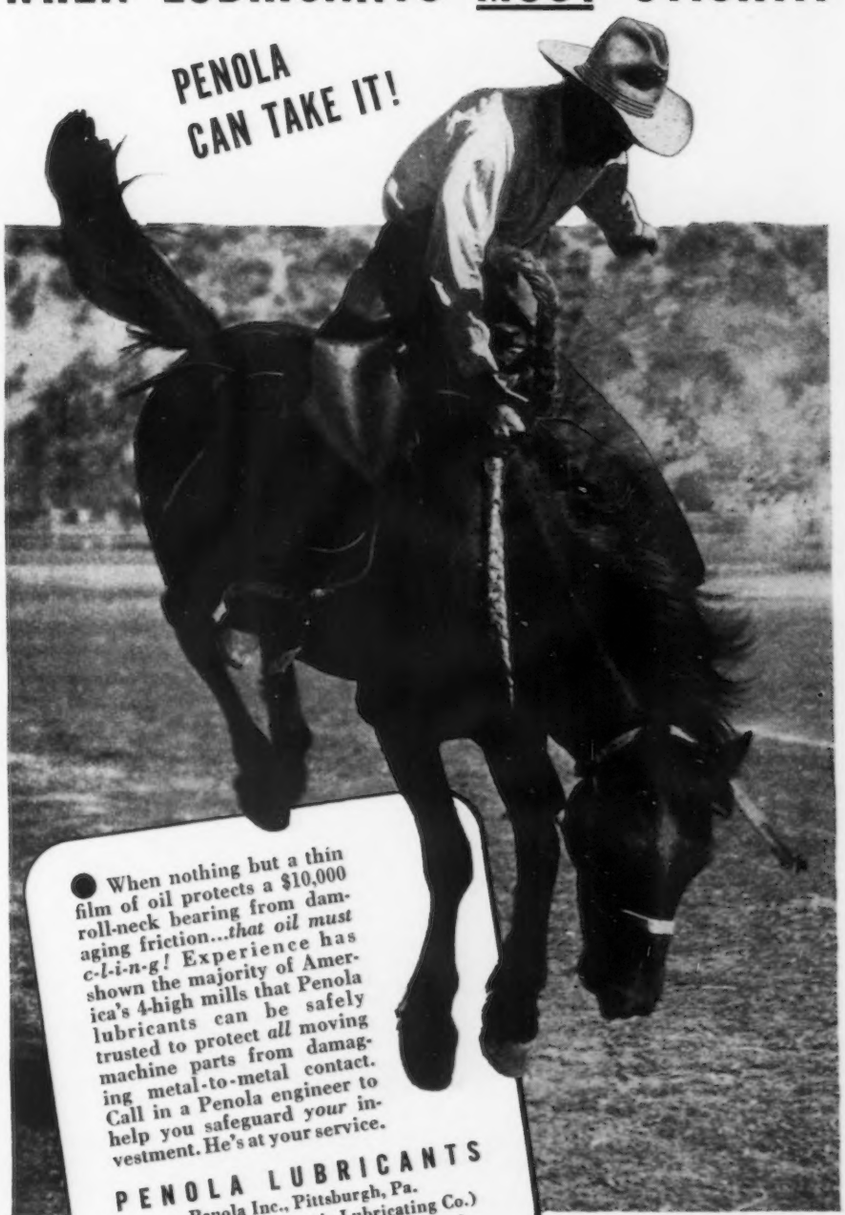
Rockford Payrolls 47.3% Above 1925-1937 Average

Rockford, Ill.

• • • September industrial payrolls here set a new mark, being 47.3 per cent above the 1925-27 average. This surpassed the record attained in May and June of 1937 when wage payments were 44 per cent above the 1925-27 level.

WHEN LUBRICANTS MUST STICK...

PENOLA CAN TAKE IT!



When nothing but a thin film of oil protects a $10,000 roll-neck bearing from damaging friction...*that oil must c-l-i-n-g!* Experience has shown the majority of America's 4-high mills that Penola lubricants can be safely trusted to protect *all* moving machine parts from damaging metal-to-metal contact. Call in a Penola engineer to help you safeguard *your* investment. He's at your service.

PENOLA LUBRICANTS

Penola Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Co.)
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

Tax On Defense Materials May Go To Supreme Court

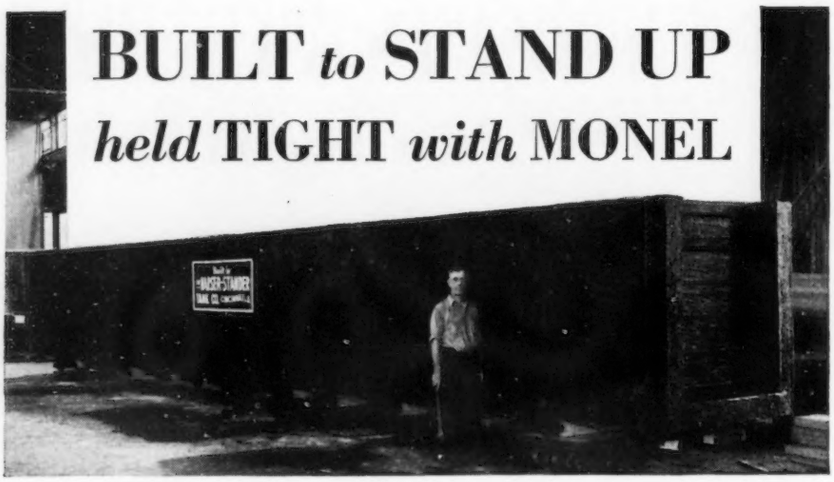
Birmingham

• • • **Whether Alabama's** two per cent sales tax is applicable to materials used by contractors in national defense projects may be decided by the U. S. Supreme Court.

The question came up when John Hodges, president of a Montgomery, Ala., firm building defense structures at Fort McClellan, Anniston, endeavored to find out whether the materials he was using were subject to the sales tax.

T. T. Lawson, Alabama attorney general, has suggested that a plan be worked out whereby tax payments can be held up, without penalty, until a court decision is obtained.

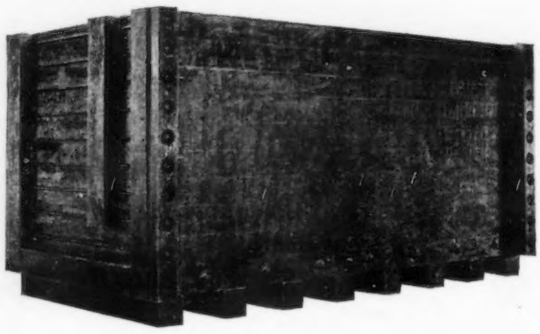
BUILT *to* STAND UP *held* TIGHT *with* MONEL



Long experience, sound construction and the best of materials go into Hauser-Stander products

One or two leaks in a long pickling tank like this and bills for acid can mount sky high. But Hauser-Stander guard against *that*. Built of spliced lengths of 8 inch Douglas fir, this 42 foot long, 4 foot wide, 5 foot deep monster is held tight by tie-rods that resist corrosion and stay strong and tough, because made of Monel.

One of two built for a prominent Ohio steel mill, this Hauser-Stander tank is 14 feet 8 inches long, 4 feet 7 inches wide and 7 feet deep. Weighing 14 tons, and made of 10 inch long-leaf yellow pine secured by Monel tie-rods, it is built to stay tight in tough service.



YEARS of experience in building pickling tanks for the country's biggest users have taught the Hauser-Stander Tank Co. what kind of construction is most satisfactory. Also what kind of metal for tie-rods, bolts and accessories best withstands the attack of pickling acid. That is why in both of the tanks shown above metal parts are Monel. Full information on this durable pickling room metal gladly mailed on request. Address:

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

INCO MONEL

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.

U. S. Steel Export Co. To Sell Kennametal Tools

• • • **McKenna Metals Co.,** Latrobe, Pa., has announced completion of arrangements under which United States Steel Export Co. will sell Kennametal tools, tool blanks, drawing dies and wear-resisting parts to foreign markets. The new arrangement does not affect the sales agreement with the George H. Alexander Machinery, Ltd., Birmingham, England, who have the British patent rights to Kennametal, nor does it affect the manufacture and sale in Canada, which are carried on by Kennametal of Canada, Ltd., Hamilton, Ont.

Wakefield Brass Co. Doubles Plant Capacity

Cleveland

• • • **The Wakefield Brass Co.,** manufacturer of commercial lighting equipment, has completed an expansion program doubling the size of its plant in nearby Vermilion, Ohio. The work was handled by the Austin Co. The additional space will be devoted to handling the company's rapidly expanding business in fluorescent lighting units.

"Fifty-five per cent of our business this year has been in fluorescent units, as against 3 per cent last year," said A. F. Wakefield, president, "while our business in other types has increased about 5 per cent. While 1939 was the best year since we entered business in 1907, an increase of 40 per cent over last year's volume is now indicated for 1940."

Excelsior Steel Furnace Increases Capacity By 25%

Chicago

• • • **Expansion by** 25 per cent of its capacity by January, 1941, has been announced by the Excelsior Steel Furnace Co. Expansion will take place in present quarters which include two new building additions, each 40 x 140 ft. of one story construction. New equipment will be added by Excelsior, which has been manufacturing furnaces, pits and fittings, stove pipes and elbows for nearly 60 yr.

Auto Air Defense Board Names Adviser

Detroit

• • • **Appointment** of a technical adviser from the aviation industry has been announced by the Automotive Committee for Air Defense which was created Oct. 25 to enroll all branches of the automotive industry in the manufacture of parts and sub-assemblies for multi-engined bombing planes. W. F. De Groat, an aeronautical engineer and until recently chief engineer of the Aviation Manufacturing Corp., Barkley-Grow Aircraft Division, is the technical adviser named on a temporary basis and functioning under C. C. Carlton, vice-president of Motor Wheel Corp., who is acting as director of the committee until election of a permanent head.

Automobile Manufacturers Association in its November issue of "Automobile Facts" points out that the entire new plane building program has to be submitted to Congress before contracts for actual production can be let. In addition, recent Washington and foreign dispatches indicate that the British will place a similar order for 12,000 bombers and probably will take every other one off the assembly floor after assembly is started.

Structural Code Amended By A. I. S. C.

• • • **The American Institute of Steel Construction,** 101 Park Avenue, New York, has amended its Code of Standard Practice with reference to painting and galvanizing of steel structures other than bridges. Subsection (a) of section 3 of this code has been amended to read as follows:

"Painting and Galvanizing: A percentage of the theoretical weight of the material protected shall be added as follows: One-half of 1 per cent for each *shop* coat of paint."

Nov. 15 Guest Day at Warner & Swasey Plant

Cleveland

• • • **Warner & Swasey Co.** has set aside Friday, Nov. 15, as Guest Day, when the new plant will be in full operation and open for inspection.

Tool Steel Prices Are Reaffirmed by One Maker

Pittsburgh

• • • **Vanadium Alloys Steel Co.** here with its works at Latrobe, Pa., has, according to Floyd Rose, vice-president, reaffirmed the present price of 67c. a lb. base on high speed steel for the first quarter of 1941. This price prevailed during the whole of 1940.

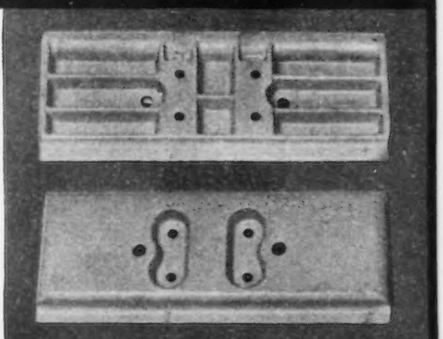
Republic Moves Newton Plant To Warren

Warren, Ohio

• • • **A large section** of Republic Steel Corp.'s Newton Falls, Ohio, plant is being dismantled and removed to the Warren works. The two plant sections, each 90x400 ft., will provide warehouse and storage space for Republic Steel's hot strip mill at Warren.

FORGINGS REQUIRE LESS MACHINING TIME and HELP SPEED UP PRODUCTION

LINK-BELT POWER SHOVELS include forgings for track shoes, turntable rollers, and lever handles. Forgings enable this manufacturer's production department to reduce loss from rejections because forgings are free of concealed defects in an unusual degree.



FORGINGS REDUCE DEADWEIGHT—INSURE ACCURACY and STEP UP SALABILITY of EQUIPMENT

Among several forgings used in Landis Bolt Threading Machines are these Forged Grippers. Landis engineers reduced deadweight in their equipment with forgings. Forgings possess plus strength in lighter sectional thicknesses through scientific weight distribution.

"Drop Forging Topics" gives actual information about the application of forgings in the manufacture of a wide range of equipment. It is published particularly for engineers and designers, metallurgists, production and management executives. If you are not already receiving it, write today. It's free.

THERE ARE NO SUBSTITUTES FOR FORGINGS

DROP FORGING ASSOCIATION

605 HANNA BUILDING • CLEVELAND, OHIO

Canada May Build Large Warships

Ottawa

• • • **Placing of war** contracts on a much broader scale, to include a number of articles not previously manufactured in Canada, will be undertaken immediately, according to official government circles. Development of the Canadian shipbuilding industry to a point where large naval vessels may be produced is under consideration, Navy Minister Macdonald stated at a press conference here. The Minister did not give details of the proposed vessels, except to say they would be "very large."

It is estimated that some 14,000 men are employed in the shipyards of the Dominion and allied industries of the ship construction program. Before the outbreak of war the shipbuilding industry had a total of 333 employees.

While the huge building program for the British Commonwealth Air Training Plan and the military training scheme is rapidly nearing completion, heavy war-time construction in Canada continues at its peak, C. D. Howe, Minister of Munitions and Supply, stated. Armament factories and plant extensions are being built all across Canada.

Factory and plant extensions, for which financial commitments have been made by the government, have total value of some $250,000,000 the Minister said.

Contracts and orders placed by the Department of Munitions and Supplies, announced in the past week had total value of $28,487,729, of which orders valued at $122,627 were awarded to United States companies. Outlay also included capital expenditure totaling $790,000, of which J. L. E. Price & Co., Ltd., Montreal, received $430,000; Milne & Nicholls, Toronto, $350,000, and Ewart Armer & Byam, Toronto, $10,000. The most important orders on the list were for mechanical transport, totaling $7,445,973 and aircraft at $4,234,755. The larger orders follow:

Mechanical transport: Ford Motor Co. of Canada, Ltd., Windsor, $7,256,100; Chrysler Corp. of Canada, Ltd., Windsor, $92,918; International Harvester Co. of Canada, Ltd., Ottawa, $90,956.

Aircraft: Fleet Aircraft, Ltd., Fort Erie, Ont., $4,065,768; Standard Tube Co., Ltd., Ottawa, $78,665; Boeing Aircraft of Canada, Ltd., Vancouver, B. C., $26,361.

Instruments (technical): Ontario Hughes-Owens Co., Ltd., Ottawa, $952,080; Instruments, Ltd., Ottawa, $163,520; Aviation Equipment & Export Inc., Ottawa, $35,645; Northern Electric Co., Ltd., Ottawa, $27,712; Sutton-Horsley Co., Ltd., Toronto, $228,125; United States Gauge Co., Montreal, $106,824.

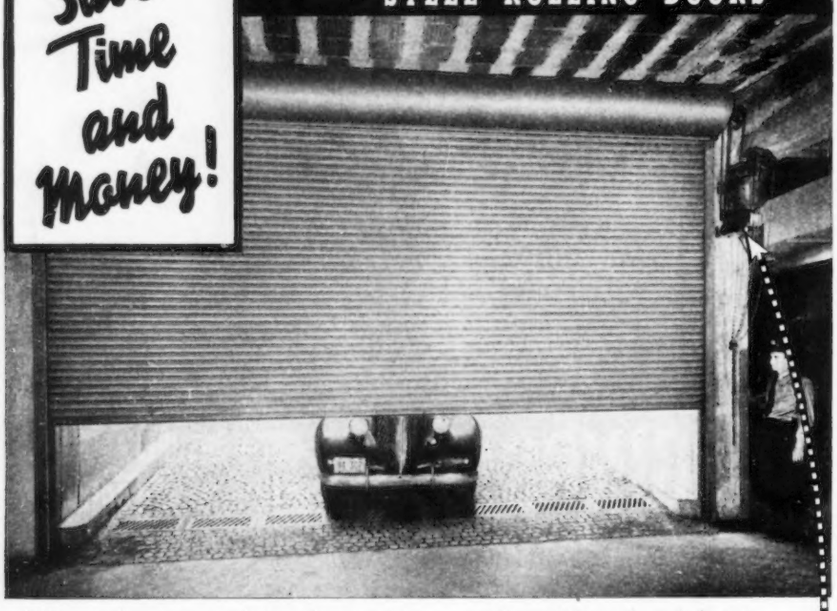
Electrical equipment: Air Ministry, England, $46,500; Canadian Marconi Co., Montreal, $39,968; Outboard Marine & Mfg. Co. of Canada, Ltd., Peterborough, Ont., $36,558.

Machinery: Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Que., $27,540.

Munitions: Defense Industries, Ltd., Montreal, $249,600.

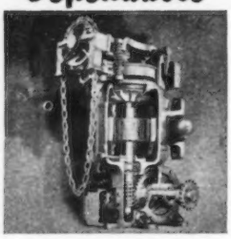
Save Time and Money!

with KINNEAR MOTOR OPERATED STEEL ROLLING DOORS



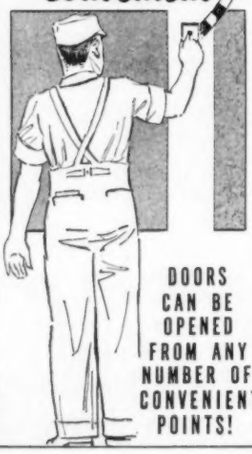
Take any key feature of these famous doors — you'll quickly see how it boosts door efficiency! First, Kinnear Rolling Doors are more ideally suited for time-saving, step-saving Motor Operation. And take their vertical, coiling upward operation! That saves floor, wall and ceiling space, and keeps the doors out of the way of plant operations and all traffic when open. Or look at the rugged, all-steel construction! That not only assures longer wear — it also gives you protection against intrusion, riot, sabotage and theft — it defies weather, resists accidental damage and repels fire. Again, there's Kinnear's positive, effective spring counterbalance — assuring smooth, easy operation! Check the other gains your plant will make with Kinnear Rolling Doors . . . write for complete catalog TODAY! The Kinnear Manufacturing Company, 1780-1800 Fields Ave., Columbus, Ohio.

Dependable



This rugged Kinnear Motor Operator opens the doors, quickly, smoothly, easily. Built for long, carefree, economical, heavy-duty service! Easily added to any Kinnear Rolling Door—whether new or now in service.

Convenient



DOORS CAN BE OPENED FROM ANY NUMBER OF CONVENIENT POINTS!

KINNEAR ROLLING DOORS

FDR'S Share Of Labor Vote Cut

• • • **While most industrial** communities gave President Roosevelt more votes last week than in 1936, the President's share of the total vote cast in such areas was lower against Willkie than against Landon, his 1936 opponent. In Homestead, Pa., Roosevelt reached a high mark of 85 per cent. A study of the vote in industrial towns suggests that:

1—John L. Lewis' indorsement of Willkie, after his long and vigorous support of President Roosevelt, had little effect on the labor vote.

2—Membership in the steel union had little direct influence on the election since steel workers in relatively unorganized territories backed Roosevelt as strongly as those in which the union is entrenched.

It was significant that Ohio's industrial counties enabled the President to win that state by about 143,000 votes. In Mahoning County (Youngstown) the President received 68.79 per cent of the 113,941 votes cast, contrasted with the 72 per cent he received in the 1936 election.

Cuyahoga County (Cleveland) gave the President a lead of 138,024 votes, or 62 per cent of the total vote. (Roosevelt spoke in Cleveland on Nov. 2.) In Lorain County, another steel center, the Roosevelt lead was 2586 votes, or 53 per cent of the total vote. In Stark County (Canton and Massillon) the President was ahead by 13,113 votes, 55 per cent of the total vote.

The vote in other Ohio industrial counties included:

County	Willkie	Roosevelt
Butler	23,019	29,947
Franklin	92,739	96,523
Hamilton*	153,536	147,266
Jefferson	16,622	29,199
Lucas	76,286	77,911
Montgomery	57,746	85,489
Scioto	19,476	21,942
Summit	63,027	89,395

*Incomplete.

In the strictly "labor section" of Lake County, Ind., where most of Chicago's steel mills draw their labor supply, Wendell L. Willkie increased the 1940 Republican vote by 36 per cent over the total cast for Landon in 1936, while President Roosevelt added only .049 per cent to the votes he received in 1936. Roosevelt's 1940 plurality was 26,087 compared to a difference of 34,871 in 1936.

Union activity in the Chicago area this year was feverish compared to four years ago. Though local officials were divided in their personal indorsements of John L. Lewis, himself, the SWOC here was unanimous in its indorsement of Roosevelt and the third term and union officials feel that they were able to cancel the effect of Lewis' support of Willkie.

Here is the vote of Lake County by cities and towns:

	Roosevelt	Willkie
Gary	28,088	15,472
Hammond	17,196	12,689
East Chicago	14,554	5,575
Whiting	2,837	1,631
Hobart	1,593	1,614
Hobart Township	1,447	653
Crown Point	819	1,712
Center Township	457	630
Grand Total	71,985	45,898

1936-1940 VOTE TOTALS IN PITTSBURGH-VALLEYS AREA

	Roosevelt		Landon	Willkie
	1936	1940	1936	1940
Pittsburgh(*)	29,002	32,326	7,540	12,890
McKeesport, Pa.	12,715	14,285	6,806	9,476
Clairton, Pa.	3,828	4,537	1,618	2,207
Duquesne, Pa.	4,259	4,908	1,451	2,655
Homestead, Pa.	5,921	7,833	1,313	1,430
Aliquippa, Pa.	6,131	6,621	2,971	3,213
Braddock, Pa.	5,089	5,726	1,764	1,746
Youngstown, Ohio(**)	64,968	79,387	24,841	37,554

(*) 4 steel labor wards only. (**) Includes all of Mahoning County.

HOW LABOR VOTED IN MICHIGAN INDUSTRIAL TOWNS

	Roosevelt		Landon	Willkie
	1936	1940	1936	1940
Wayne County(*)	404,055	440,791	190,732	268,573
Genesee County(**)	49,891	49,233	21,097	38,022
Bay County	13,789	14,967	8,729	14,662
Kent County(***)	44,823	48,440	36,633	53,121
Muskegon	17,252	19,454	9,366	15,968
Jackson	19,288	15,173	16,350	24,491
Oakland	40,329	46,223	30,071	47,885
Saginaw	22,592	21,275	15,527	25,527

(*) Detroit. (**) Flint. (***) Including Grand Rapids.

Sheet & Tube's Third Quarter Profit $2,842,280

Youngstown

• • • **Youngstown Sheet & Tube Co.** and subsidiary companies report net profit for the quarter ended Sept. 30, 1940, of $2,842,280 after depletion and depreciation. This compares with $1,169,283 the previous quarter and $765,066 during the third quarter of 1939. Net income of the company for the first nine months of this year amounted to $5,265,492, against a profit of $1,311,259 in the first nine months of 1939.

Pittsburgh

• • • **Follansbee Steel Corp.** and subsidiaries report for the quarter ended Sept. 30, first operating period for the new company, a net loss of $33,298. Net sales for this period, which does not reflect any use of new facilities now being installed by the company, were $1,770,546. As a result of the modernization program there were special interest charges of $13,660 and there was a provision of $76,917 for depreciation. Operating profit after provision for all expenses except depreciation and interest charges, and excluding some miscellaneous income, amounted to $50,345.

Reed-Prentice Gets Order for 120 Lathes

• • • **Reed-Prentice Corp.**, Worcester, Mass., on Nov. 5, received a defense contract for 120 lathes having a total value of $533,000. The lathes will be shipped to various shipbuilding plants throughout the country and will be used in naval construction.

Supreme Court Rules For Republic Steel

Washington

• • • **In a case involving** Republic Steel Corp., the Supreme Court on Tuesday ruled that the National Labor Relations Board has no legal power to require Wagner Act violators to pay back wages ($750,000 to $1,000,000) to reimburse public relief agencies for amounts paid to strikers or workers illegally discharged.

In its order against the company, requiring it to rehire with back pay SWOC employees who participated in the "Little Steel" strike of 1937, the NLRB had directed the company to deduct from the payments to the reinstated employees the amounts they had received for work performed upon "work relief projects" and to pay over such amounts to the appropriate governmental agencies. The third circuit court of appeals at Philadelphia directed enforcement of the board's order in November, 1939.

High Court to Review Identical Bid Case

Washington

• • • **Because of the** possible effect on the national defense purchasing policy much interest was shown in the agreement of the Supreme Court on Tuesday to review a lower court decision which denied the government the right to sue for triple damages under the anti-trust laws for so-called losses from identical bids submitted by eighteen rubber tire manufacturers.

Actually the government threw out the identical bids and subsequently bought the tires from Sears, Roebuck & Co. It was urged therefore that the government did not suffer a loss.

Pratt & Whitney Will Build Plant Addition

West Hartford, Conn.

• • • Pratt & Whitney Division of Niles-Bement-Pond Co. has announced plans for a $750,000 addition to its plant here. Clayton R. Burt, Pratt & Whitney president, said the expansion, undertaken at the request of the government for defense needs, will employ from 600 to 700 persons.

"Free Press" Invoked in Weirton Bulletin Defense

• • • **Efforts by Labor** Board examiners to suppress a Weirton Steel Co. publication on allegations it was a "vehicle of anti-union propaganda" is an encroachment on freedom of the press, John E. Laughlin, Weirton Steel attorney, declared this week. He asked the Labor Board to set aside a proposed order finding the company guilty of Wagner Act violation.

Machine Tool Priority Committee Organized

Washington

• • • **Establishment** of a Machine Tool Priority Committee to coordinate national defense, commercial and export demands on the machine tool industry was announced on Tuesday by the priorities board of the National Defense Advisory Commission.

The committee, composed of representatives of the industry, the Army, Navy and Defense Commission, will formulate policies governing operation of the voluntary preference rating system, now in effect, as it applies to machine tool contracts. Such policies will be submitted through Donald M. Nelson, administrator of priorities, to the priorities board for consideration and approval.

Mason Britton, assistant director of the machine tools and heavy ordnance division of the Defense Commission, has been appointed administrative officer of the committee.

Firth Sterling Carbide Tool Division Sets Record

Pittsburgh

• • • **Orders received** during October by the carbide tool division of Firth-Sterling Steel Co. established an all-time record in dollar volume for a single month, according to L. Gerald Firth, president.

October Shipments Of U. S. Steel Subsidiaries At 11-Year High

• • • **Estimated at 95.8** per cent of the corporation's rolled and finished steel capacity, shipments of finished steel by subsidiary companies of the U. S. Steel Corp. in October were 1,572,408 net tons, the highest for any month since May, 1929, when 1,701,874 tons were shipped.

Month	1936 Shipments	1936 Per Cent of Capacity*	1937 Shipments	1937 Per Cent of Capacity*	1938 Shipments	1938 Per Cent of Capacity*	1939 Shipments	1939 Per Cent of Capacity*	1940 Shipments	1940 Per Cent of Capacity*
January	795,214	44.8	1,268,403	75.4	570,264	33.7	870,866	51.8	1,145,592	69.8
February	747,375	45.3	1,252,845	82.5	522,395	35.5	747,427	49.3	1,009,256	65.8
March	863,946	50.5	1,563,113	92.7	627,047	37.2	845,108	50.4	931,905	56.8
April	1,080,667	63.2	1,485,231	91.0	550,551	33.7	771,752	47.5	907,904	57.1
May	1,087,395	63.4	1,443,477	85.5	509,811	30.2	795,689	47.4	1,804,057	66.0
June	978,030	57.1	1,405,078	85.8	524,994	32.1	807,562	49.7	1,209,684	76.1
July	1,050,085	61.3	1,315,353	77.9	484,611	28.8	745,364	44.5	1,296,887	79.2
August	1,019,882	59.6	1,225,907	72.6	615,521	36.3	885,636	52.7	1,455,604	88.6
September	1,060,708	62.0	1,161,113	71.1	635,645	37.5	1,086,683	66.9	1,392,838	87.8
October	1,108,973	62.6	875,972	52.0	730,312	43.1	1,345,855	79.9	1,572,408	95.8
November	974,292	59.2	648,727	39.7	749,328	45.6	1,406,205	86.1		
December	1,178,598	68.8	539,553	32.1	765,868	45.2	1,443,969	85.8		
Yearly adjustment	(—)40,163	...	(—)87,106	....	(+)29,159	...	(—)44,865	...		
Total for year	11,905,002	58.2	14,097,666	70.4	7,315,506	36.1	11,707,251	59.4		

* Rolled and finished steel capacity. Shipments are in net tons.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **R. E. W. Harrison,** formerly vice-president, Chambersburg Engineering Co., and of Clarke-Harrison, Inc., Chambersburg, Pa., has resigned both connections to accept an appointment with the U. S. Navy. With the rank of Lieutenant-Commander, Mr. Harrison is now in the office of the Assistant Secretary of the Navy, Washington, and is concerned with shore procurement activity.

• **Joseph W. Frazer,** president of Willys-Overland Motors, Inc., Toledo, was honored by the Ohio Chamber of Commerce at its banquet meeting at session in Cincinnati on Nov. 7 and 8. He was cited for his work in restoring the automobile company to its present position among Ohio manufacturers.

• **George T. Mahaney** has been appointed production manager attached to the sales promotion department of Pontiac Motor division of General Motors Corp. Prior to joining Pontiac Mr. Mahaney was Eastern sales manager for the Diesel Motors division of G.M. He succeeds **William Miller,** recently promoted to assistant sales promotion manager.

• **Harvey L. Miller** has been appointed manager of Wheeling Steel Corp.'s new district office at Houston, Tex. Mr. Miller has had many years' experience throughout Texas while a district manager at St. Louis and more recently as assistant pipe sales manager and representative there for other manufacturers in the industry. Wheeling Steel announced also that **I. G. Thompson** continues as district sales manager at Dallas, Tex.

HARVEY L. MILLER, manager, Wheeling Steel Corp.'s new district office at Houston.

• **Ralph R. Rowland,** sales manager, and **Charles E. Dewar,** superintendent, have been made vice-presidents of the Champion Spark Plug Co., Toledo. Mr. Dewar has been given charge of production in all plants, including British and Canadian units. **Charles L. Corwin** has been promoted to sales manager. Mr. Rowland and Mr. Corwin started as salesmen about 25 years ago and Mr. Dewar began as a toolmaker in 1913.

• **M. E. Morgan,** superintendent of open hearth, blast furnace and coke works at the Gulfsteel district of Republic Steel Corp., has been made superintendent of blast furnaces and coke works for the Youngstown district of Republic.

• **W. H. Lautz,** for a number of years with the Buffalo office of the Youngstown Sheet & Tube Co., is now associated with Seneca Steel Service, Inc., 1050 Military Road, Buffalo.

• **B. V. E. Nordberg,** Milwaukee, has been elected senior delegate and regional conference chairman at the annual regional delegate conference of the American Society of Mechanical Engineers in Milwaukee.

• **Ray R. Toepel** has been appointed sales manager of the Brillion Iron Works, Inc., Brillion, Wis. He goes to the company with 23 years of experience in the sale of agricultural implements.

• **L. G. Atkinson,** who has been identified with the Westinghouse Electric & Mfg. Co., East Pittsburgh, since his graduation from the electrical engineering school of North Carolina State College in 1933, has been appointed manager of the small De-ion circuit breaker section of the circuit breaker sales department. After completing two years in the Westinghouse student course, he entered the engineering department of the switchgear division and in 1936 was transferred to the sales department of that division.

• **Frank Huston** has been elected president and general manager of Barium Stainless Steel Corp., Canton, Ohio. Admiral **Charles Conrad,** Washington, has been elected chairman.

• **R. E. Griffin** has been appointed production manager for Oldsmobile division of General Motors Corp. Mr. Griffin joined Oldsmobile in 1916 in the service department, acted as assistant service manager for several years, and in 1921 took over the distribution department. Succeeding him as distribution manager is **T. R. Taffee,**

R. E. GRIFFIN, production manager for Oldsmobile division of General Motors Corp.

formerly assistant manager of that department and connected with Oldsmobile since 1926. **L. J. Culver,** distribution manager for the Linden, N. J., assembly plant, will take over Taffee's duties as assistant distribution manager. He started in the service department of Oldsmobile in 1920.

• **William F. Conlin,** heretofore division metallurgist in the Cleveland office of American Steel & Wire Co., has been appointed open-hearth superintendent at the Steel works in Donora, Pa., where he has worked previously. **John A. Slenker,** present open-hearth superintendent at Donora for the company, is transferred to Cleveland as a division metallurgist. The changes are in line with the company policy of giving its men as well rounded experience as possible. **Henry R. Patterson,** assistant general superintendent of Donora steel and wire works, is being moved to the main office in Cleveland as engineer of wire drawing development. At the same time, **A. F. Ilacqua** has been appointed division metallurgist on high carbon steels at the main office.

• **O. E. Ostrom,** formerly with Carnegie-Illinois Steel Corp. and Steel Sales Corp., St. Louis, has joined the Sheffield Steel Corp., Kansas City.

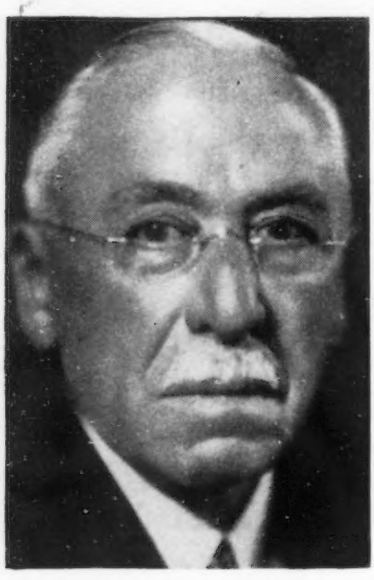
Obituary

• **Charles F. Morley,** president of the Morley Machinery Corp., Rochester, N. Y., died at his home in that city on Oct. 31, aged 56 years. Early in his career he was a production foreman of the Westinghouse Electric & Mfg. Co., and from 1910 to 1911 held a similar post with the Domestic Appliance Co. Later he was superintendent of the Payne Elevator Co. He formed the C. F. Morley Co. in Rochester in 1913, of which he was head until 1915, when he joined the Symington Co. as superintendent and vice-president in charge of production. He founded the Morley Machinery Corp. in 1920. He had extended experience in the manufacture of ordnance shells and had been on duty in the office of the Assistant Secretary of War in 1933 and in 1936, consultant at the Frankford Arsenal.

• **Emil Vilter,** chairman of the board of the Vilter Mfg. Co., Milwaukee, died Oct. 30, at his home in Milwaukee after an illness of 18 months. He was a native of Milwaukee and son of Emil Vilter, one of the founders of the Vilter company. After his academy training in Milwaukee he attended the University of Wisconsin. He started to work for his father's company as a $9 a week apprentice in the machine shop. He was later given charge of installation work and at the death of his brother, Theodore, became president of the firm. In 1934 he retired to become chairman of the board. His brother, William O. Vilter, now is president and treasurer of the company.

• **Charles L. Allen,** chairman of the board of the Norton Co., Worcester, Mass., died of pneumonia at his home in that city on Nov. 4, aged 82 years.

Mr. Allen joined the company as a bookkeeper in 1881, when the company was a small pottery shop. An experiment in making a grinding wheel in 1885 was so successful that the company began the manufacture of grinding tools. On the reorganization of the company, Mr. Allen became general manager. He was made secretary and director in 1892 and treasurer in 1912. Seven years later he became president and general manager, positions he held until 1933, when he became chairman of the board. Mr. Allen took an active part in civic affairs, having been a founder of the Worcester Welfare Federation, trustee of the Worcester Polytechnic Institute, and chairman of the Worcester Municipal Auditorium.



THE LATE Charles L. Allen, chairman of the board of the Norton Co.

• **Paul M. Macklin,** executive vice-president and general manager of the Wickwire Spencer Steel Corp., New York, his son, **John Macklin,** foreman at the Buffalo plant of the company, and **George W. Nelson,** superintendent of the company's new wire mill in Buffalo, were drowned at a lake called Frozen Ocean in Maine on Nov. 6, while on a hunting trip.

Paul M. Macklin had been identified with the company and its predecessor the Spencer Wire Co. for his entire business career of over 25 years. He was made vice-president in 1927 and executive vice-president of the company in 1929. He was 55 years old.

George W. Nelson, who had been with the company for over 20 years and who was superintendent of Wickwire Spencer's new wire mill at Buffalo, was formerly superintendent of the company's Goddard works.

THE LATE Paul M. Macklin, executive vice-president and general manager of the Wickwire Spencer Steel Corp.

Metal Working Activity

. . . Latest Data Assembled by The Iron Age
From Recognized Sources. In Net Tons.

	Sept. 1940	August 1940	Sept. 1939	9 Months 1940	9 Months 1939
Steel Ingots:					
Monthly output[a]	5,895,232	6,033,037	4,769,468	46,201,463	33,535,012
Average weekly output[a]	1,377,391	1,361,859	1,114,362	1,180,416	859,872
Per cent of capacity[a]	90.75	89.72	72.87	77.77	56.23
Pig Iron:					
Monthly output[b]	4,176,527	4,238,041	3,223,983	33,552,113	22,867,049
Raw Materials:					
Coke output[c]	4,899,201	4,959,973	3,979,521	41,048,570	29,698,351
Lake ore consumed[d]	6,352,548	6,384,832	4,184,884	49,536,393	28,074,239
Scrap iron consumed[r]	4,341,120	4,444,160	3,380,160	33,131,660	23,682,480
Castings:					
Malleable, orders[e]	53,079	52,994	64,732	369,523	327,891
Steel, orders[e]	.....	.....	96,687	.....	398,474
Finished steel:					
Trackwork shipments[a]	5,496	6,480	4,916	61,150	49,597
Fabricated shape orders[f]	221,991	109,918	118,020	1,143,314	988,575
Fabricated plate orders[e]	.....	.....	39,751	.....	269,980
U. S. Steel Corp. shipments[g]	1,392,838	1,455,604	1,086,683	10,433,727	7,556,087
Fabricated Products:					
Automobile production[h]	300,000**	75,873	188,757	3,036,104**	2,459,973
Steel furniture shipments[e]	2,391,691	2,339,441	2,006,508	20,202,717	16,070,563
Steel boiler orders[e] (sq. ft.)	3,726,433	1,274,940	1,752,243	12,240,422	8,653,259
Locomotives ordered[i]	57	65	52	358	213
Freight cars ordered[i]	9,470	7,645	24,231	33,486	33,623
Machine tool index[j]	94.9	93.3	74.6	92.7†	63.4
Foundry equipment index[k]	161.2	165.4	*	158.7†	*
Gear sales index[s]	183	191	126	139.8†	95.9
Non-Ferrous Metals: (U. S. only)					
Lead shipments[l]	53,456	51,643	59,889	*372,926*	379,768
Lead stocks[l]	41,292	43,321	97,473	.....	.....
Zinc shipments[m]	66,824	64,065	69,424	502,278	407,770
Zinc stocks[m]	30,965	44,670	95,615	.....	.....
Tin deliveries[n]	12,779	13,966	5,656	91,632	52,214
Refined copper deliveries[o]	96,485	96,383	*	682,961	*
Refined copper stocks[o]	185,313	198,730	*	.....	*
Exports:					
Total iron and steel[p]	1,221,052	1,402,075	575,613	7,909,784	4,278,582
All rolled and finished steel[p]	.....	495,263	167,674	*2,585,315*	1,234,176
Semi-finished steel[p]	.....	411,619	36,319	*1,497,360*	139,888
Scrap[p]	255,608	355,991	330,680	2,419,833	2,761,594
Imports:					
Total iron and steel[p]	.....	2,105	29,874	*45,695*	266,047
Pig iron[p]	.....	882	4,176	*7,724*	29,428
All rolled and finished steel[p]	.....	769	8,342	*11,865*	144,670

Data in italics are eight months' totals.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; [i] *Railway Age;* [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [r] Institute of Scrap Iron and Steel; [s] American Gear Manufacturers Association.

* Not available. † Monthly averages. ** Estimated.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Nov. 12, 1940	Nov. 4, 1940	Oct. 15, 1940	Nov. 14, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd)	1.90	1.90	1.90	1.90

	Nov. 12, 1940	Nov. 4, 1940	Oct. 15, 1940	Nov. 14, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$24.84
*No. 2, Valley furnace	23.00	23.00	23.00	23.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	23.06
No. 2, Birmingham	19.38	19.38	19.38	19.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	23.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	24.34
*Basic, Valley furnace	22.50	22.50	22.50	22.50
Malleable, Chicago†	23.00	23.00	23.00	23.00
*Malleable, Valley	23.00	23.00	23.00	23.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard. *See footnote under pig iron prices on page 130.

	Nov. 12, 1940	Nov. 4, 1940	Oct. 15, 1940	Nov. 14, 1939
Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh.	$21.50	$21.50	$21.50	$21.25
Heavy melt'g steel, Phila.	20.75	20.75	20.75	20.75
Heavy melt'g steel, Ch'go	**20.00**	19.75	19.75	17.50
Carwheels, Chicago	20.25	20.25	20.25	17.50
Carwheels, Philadelphia	**23.25**	22.75	22.75	21.25
No. 1 cast, Pittsburgh	22.25	22.25	20.25	21.25
No. 1 cast, Philadelphia	22.75	22.75	22.75	22.25
No. 1 cast, Ch'go (net ton)	17.75	17.75	17.75	15.75
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$5.25	$4.75	$4.75	$5.00
Foundry coke, prompt	5.75	5.25	5.25	5.75
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.50
Copper, Lake, New York	12.00	12.00	12.00	12.50
Tin (Straits), New York	51.00	51.00	51.875	**51.00
Zinc, East St. Louis	7.25	7.25	7.25	6.50
Lead, St. Louis	**5.65**	5.35	5.10	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.
**Nominal.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 121-130 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Nov. 4, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$20.75 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$20.67 a Gross Ton
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$20.54 a Gross Ton
One year ago	2.236c. a Lb.	$22.61 a Gross Ton	$19.83 a Gross Ton

	High	Low	High	Low	High	Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$20.67, Oct. 15	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Steel orders increasing as defense business spreads and general consumers seek further protection . . . Much of current buying for first quarter . . . No horizontal price increases expected . . . Scrap prices again advancing . . . Beehive furnace coke up 50c. a ton.

AN increasing volume of orders for steel results from the combination of a greater number of defense orders now flowing to the mills and the efforts being exerted by manufacturers and distributers not primarily engaged in defense work to protect themselves on steel against the future possibility of Government priorities and further delays in deliveries.

Although October was the best month of the year for most of the steel companies, the November bookings promise to surpass those of last month. Orders thus far received have been 20 per cent or more above those of the same period last month. In the first week of November a large company booked 40 per cent more tonnage than in the corresponding week of October.

Notwithstanding the fact that the steel industry is engaged in the greatest activity of any period of its history, there is surprisingly little confusion. Defense orders are being taken care of with the required dispatch, while at the same time general consumers are experiencing no serious inconvenience except the necessity of anticipating their requirements further ahead because of gradually lengthening deliveries.

Occasional or casual buyers, particularly those who have had no regular source of supply, may be having some difficulty in getting steel, but others are not if they wait their turn. Steel companies are scrutinizing all orders carefully in an effort to prevent over-buying.

WHILE the present intense pressure may last for several months, it is believed that there may be some relief by next April, at the latest, when there will perhaps be an easing of demand from the automobile industry and the railroads and a letting down of steel construction activity by virtue of the fact that many of the new defense plants and additions will have been erected.

With the construction phase of the defense program out of the way, in part at least, there will, of course, be larger demands for steel for manufacturing defense items. For example, about 575,000 tons of shell steel for U. S. and foreign contracts remains to be placed. Only about 185,000 tons for U. S. contracts has thus far been ordered.

Despite the intense pressure for some steel products, steel companies are actively soliciting business in other items which have lagged behind. Among the slower products are narrow hot rolled strip, oil country pipe, light rails and tin plate, although improvement has recently been taking place in some of these.

Varied items for the defense program are being sought. A large tonnage of high manganese strip will be required, for example, for army helmets. Stainless steel is to be used for many army requirements, including 34,000 field ranges recently ordered.

The British will take greatly increased quantities of steel during the next two or three months if they can obtain it. Some companies have been asked to double or triple recent allotments, which had been permitted to decline somewhat. The British program to build 120 ocean freighters in the United States would call for about 400,000 tons of steel.

MUCH of the recent steel buying has been for first quarter, as deliveries are not generally obtainable before that time except on a few items; therefore, first quarter price announcements are eagerly awaited. Fully sensing the inflation dangers inherent in a greatly mounting national debt and increasing purchasing power among the masses, the steel industry probably will do nothing of its own accord to hasten that possible development, but it is watching closely its own costs, which are beginning to rise. No horizontal price increase is probable in the first quarter. One or two smaller companies are now selling at present prices for first quarter, though most producers adhere to a price in effect at time of shipment policy. Prices of ferroalloys have been reaffirmed for the first quarter.

SCRAP prices are moving upward in some districts after a few weeks of comparatively few changes. THE IRON AGE scrap composite price is up 8c. to $20.75, the first change since the issue of Oct. 10. Buffalo steel grades are up 50c., but at Detroit there have been several declines of like amount. Advances have occurred in a number of other markets, however.

Reflecting increased demand for beehive coke, the Connellsville furnace grade is up 50c. a ton on first quarter contracts.

Ingot production remains at 96 per cent for the third consecutive week, a number of open hearth furnaces having gone out for repairs, offsetting higher operations at Chicago, Youngstown and in the West. October output of ingots, at 6,461,898 net tons, representing 96.1 per cent of capacity, was an all-time high.

The Industrial Pace . . .

UNDER THE INFLUENCE of expanding operations during the past week in two of the five durable goods industries represented in THE IRON AGE index of capital goods activity, the index has extended its upward movement moderately to 118.2, a gain of slightly less than one point over the figure for the previous week. Heavier automobile production and intensified activity in the Pittsburgh district, were chiefly responsible for the gain.

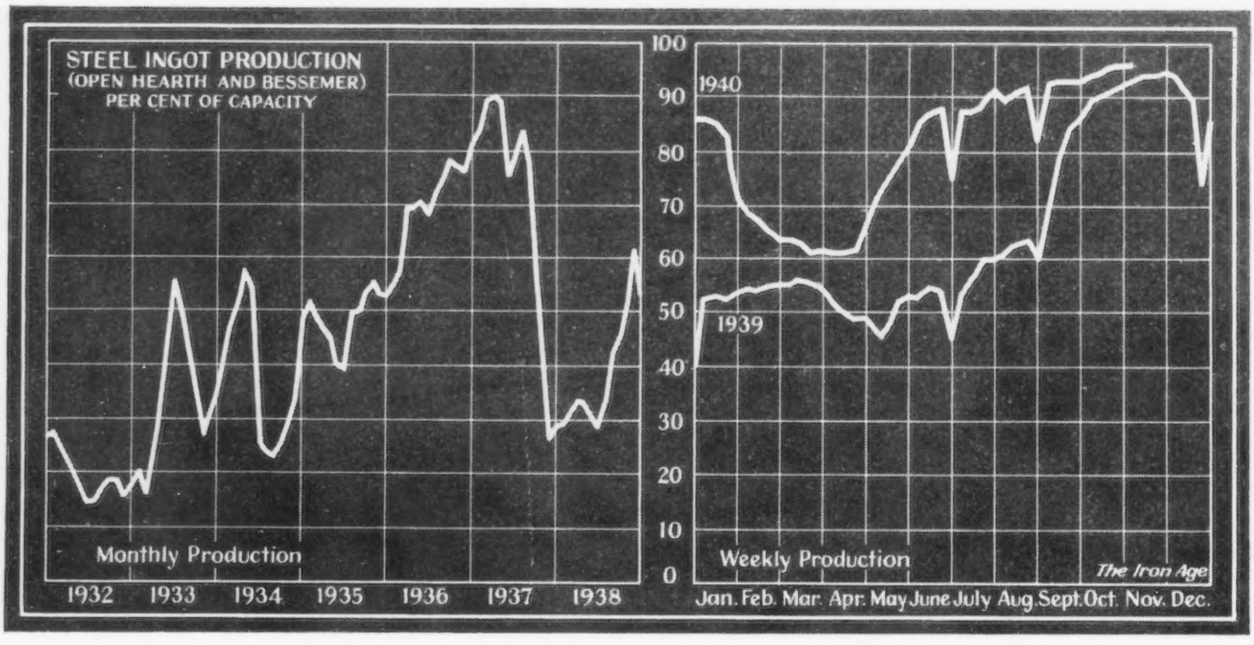
Rising 4.7 points to 121.1 from 116.4 in the preceding week, the automobile series reflected a substantial gain in output. Assemblies totaled 120,949, highest since the week ended July 3, 1937, when 122,890 cars were produced, and comparing with 118,092 two weeks ago, and 86,200 in the week of Nov. 11, 1939.

Only series appearing to have been affected by the Election Day semi-holiday was the heavy construction contracts index, which declined to 135.7 from 136.8 in the previous week, but was substantially higher than 76.2, recorded in the corresponding week of 1939. Total value of awards placed in the past week was $79,645,000, about 50 per cent below the volume of the preceding week, but 57 per cent higher than the comparable week of 1939. Compared with the previous week, privately financed awards were down to $22,645,000 from $77,107,000, and public projects were off from $80,647,000 to $57,000,000. Private construction was 11 per cent higher than the corresponding week of 1939 while public awards in the same period were exceeded by 89 per cent.

AS THE RESULT of record and near-record totals in both public and private construction, total of engineering construction awards in October was the highest on record, standing at $702,842,000, 44 per cent higher than the previous high of $97,958,000 reported in March, 1939, and 53 per cent above the average for the four weeks in September, 1940, and 130 per cent higher than the corresponding week of 1939. Private awards in October reached the highest point since May, 1930, and were 91 per cent above September, 1940, and 71 per cent above October, 1939. Public construction exceeds all previous marks, gaining 39 per cent over a month ago, and 176 per cent over October, 1939.

With the exception of the record August volume, from which they were off 6 per cent, exports of iron and steel (excepting scrap) from the United States during September were the second largest on record. The September total was 965,444 gross tons, as compared with 1,046,084 tons in August, and 244,933 tons in September, 1939, an increase of almost 400 per cent over the latter month. Britain was by far the largest consumer, taking 63 per cent of the total. Canada was second, taking 11 per cent, and Japan was third with 6 per cent.

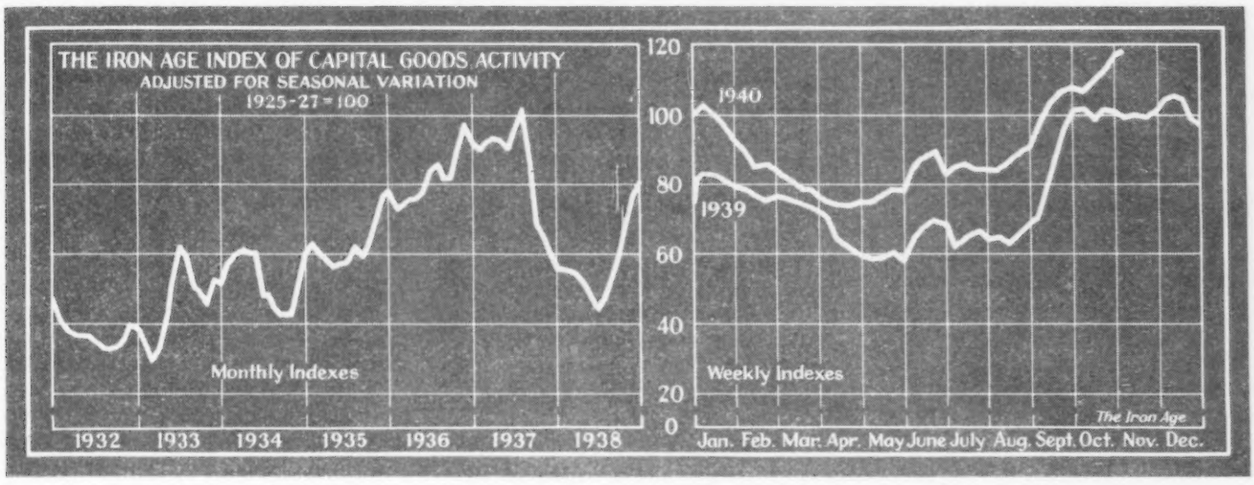
Output Holds at 96% for Third Week



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
	Current Week	96.0	99.0	96.0	94.0	89.0	104.5	104.0	89.5	109.0	104.0	76.0	100.0	75.0	**96.0**
	Previous Week	96.0	97.0	95.0*	94.0	89.0	106.0	104.0	100.0	109.0	109.0	69.0	100.0	80.0	**96.0**

* Revised

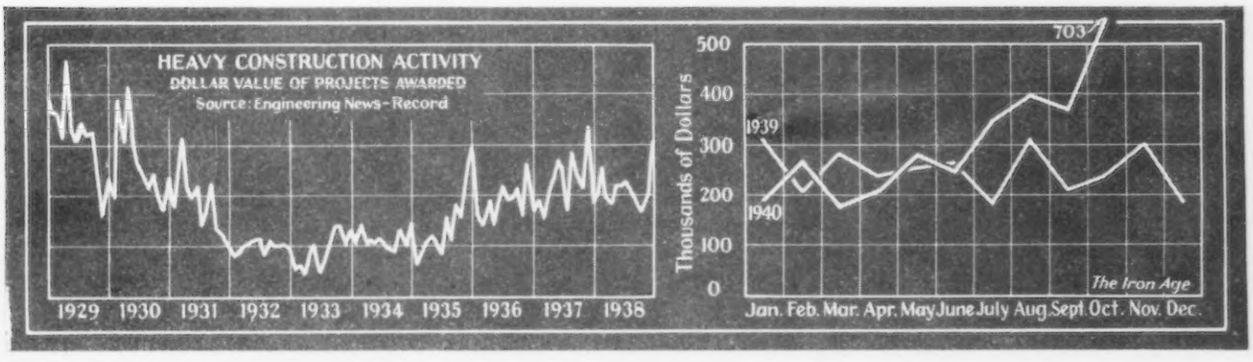
Capital Goods Index Rises Fractionally



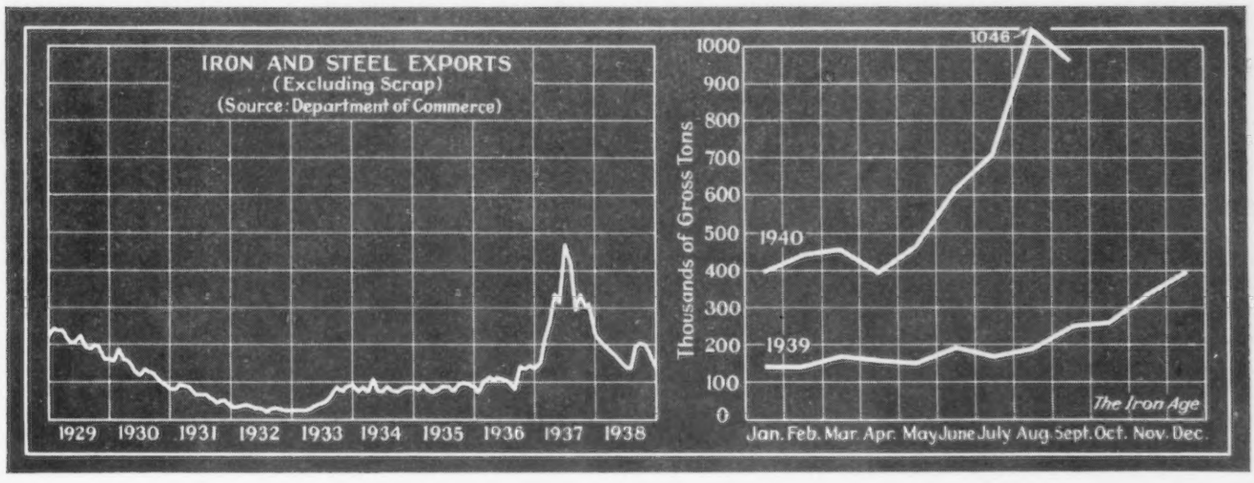
¥Component — Week Ended ➤	Nov. 9	Nov. 2	Oct. 12	Nov. 11 1939	Nov. 9 1929
Steel ingot production[1]	140.5	139.3	133.7	136.3	106.3
Automobile production[2]	121.1	116.4	105.3	99.4	116.4
Construction contracts[3]	135.7	136.8	112.0	76.2	112.0
Forest products carloadings[4]	77.1	80.8	73.4	70.7	118.0
Pittsburgh output and shipments[5]	116.5	113.7	108.9	115.0	112.0
COMBINED INDEX	118.2	117.4	106.7	99.5	112.9

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Nov. 2. Other indexes cover week of Nov. 9.

October Building Awards Set All-Time Record



September Exports Off From August Peak



Market News

. . .THE WEEK'S ACTIVITIES IN IRON AND STEEL

The Steel Outlook

. . . Present fast tempo may not run beyond April

The steel industry is now feeling a heavy impact of simultaneous demand from several sources which has given rise to one of the most active periods in modern steel history. Nor has the peak been reached as yet.

With ordinary seasonal influence at work, automobile production reaching new high levels, railroad buying expanding and direct and indirect support from the national defense program, those steel consumers who "missed the boat" in building up supplies earlier this year are attempting to make up for lost time. But with steel mills fulfilling national defense needs as rapidly as possible and also attempting to give the same service to the British, it is certain that no unduly large or speculative stocks can be built up at consumers' plants.

The present fast tempo and at times hectic situation in the steel industry, however, may be of a temporary nature since many of the factors now exerting substantial pressure on the steel market may have run their course to some extent by next April.

Railroad tonnage will then have been largely shipped, automobile buying steel may have slackened off, structural requirements for buildings involving national defense will have been satisfied for the most part, and the mad rush on the part of some consumers for supplies will have run its course.

Steel mills by that time should be in excellent position to meet the full force of direct national defense requirements.

Steel Operations

. . . Industry rate remains at 96 per cent as some furnaces go out for repairs

The fact that steel production remains virtually unchanged this week at 96 per cent of capacity is due to the shutting down of a number of open hearth furnaces for repairs. Now that most of the major companies are working at about the full limit of their capacity, it is indicated that further gains in the industry rate will come about through increases in production at plants of lesser size.

There have been a few gains this week, notably at CHICAGO, which is up one point to 99 per cent, and at YOUNGSTOWN, where the rate is also up one point to 96 per cent.

Losses, caused mainly by repairs, are at BUFFALO, DETROIT, SOUTHERN OHIO and in NEW ENGLAND. Other districts are unchanged.

This is the third consecutive week in which operations have been estimated at about 96 per cent.

New Business

. . . Steel activity surpassing any in industry's history

Pittsburgh mills are now in a period which bids well to surpass in activity any previous one in steel industry history. While operations, in point of per cent of capacity, during the first World War were at top levels, steel ingot and finishing capacity is now much greater than at that time. Furthermore, the number of consumers and grades of steel has expanded enormously since that time as well as the complexity of operations and distribution. Despite this condition, steel consumers in few if any cases are being embarrassed by lack of steel supplies.

Orders so far this month at Pittsburgh are running from 25 to 35 per cent ahead of a month ago when new records were being hung up. Some of the gains in the past week reflects a resumption for a time at least in British buying of steel, on a larger scale than was the case a month ago. Although the English are not sending in orders at the rate existent last July, the present buying which, incidentally, is held in check only by the ability of American mills to fill the orders, will run between 300,000 and 500,000 tons a month.

After months of hearing about defense business, but actually getting a very small cut of the pie compared with other sections of the country, CHICAGO steel makers now find direct defense orders flowing in at a steadily increasing pace. During the past week, new business slumped slightly at most mills, with the one notable exception, the reason being that schedules are filled up to the point where some buyers recognize the wisdom of withholding future commitments in the interest of more orderly buying. Only one mill reported an increase in new orders—an increase which made the first week of the month for that producer the peak week of the year. Deliveries have been extended sharply at all mills.

Flat rolled products which have been lagging behind bars, plates and structural shapes at CHICAGO, have taken a sharp spurt. Structural steel is probably the most active of all products in that district. The fear of priorities is responsible for the rush of future reservations, which is leading producers there to warn consumers that it is not rolling capacity but steel making capacity that may be unable to carry the load if buying is not maintained in an orderly fashion.

Shell steel orders have been prominent at CLEVELAND, where new tonnage received by steel producers so far this month is heavier than the incoming volume during the comparable part of October. With full production schedules in many divisions, the amount of new business for 1941 shipment is growing much larger. It is difficult for consumers to obtain fill-in requirements needed promptly on 1940 production.

CLEVELAND reports that the steel industry probably now holds more contracts for "identified projects" than at any time. These projects are covered by contracts for the life of the job, and some of the jobs run well into 1942, involving vast amounts of steel for building construction, railroad requirements, shipbuilding and shell production. At the same time it is generally agreed that the "big push" is still ahead of the steel industry if the government defense program proceeds according to present plans.

Prices

. . . Announcement of first quarter quotations may not come immediately

Although some in steel circles are looking for first quarter price announcements this week, there is more than an even chance that steel companies will take a longer look at present conditions before any of them will make an announcement. Hence it is likely that first quarter steel quotations may not be announced before the last week in November or the first week in December. No change in the present general base price level for the first quarter shipments is expected. Some companies because of heavy demand have eliminated some of the freight absorption on some products, thus realizing a greater mill return than was the case a few months ago.

The attitude of sellers toward first quarter business varies considerably, in the absence of a formal announcement. Some sellers are accepting business for shipment in that quarter with the understanding that prices in effect at time of shipment will rule. Others are accepting business at present prices. An eastern Pennsylvania plate producer has discontinued equalizing freight on shipments to new customers outside the mill's basing point area. Another eastern Pennsylvania producer has been following this practice of structural shapes for some time and it is expected that some merchant pig iron producers may adopt this policy.

On the basis of contracts booked for first quarter, beehive furnace coke prices are up 50c. a ton to a range of $5 to $5.25, with a possibility of a further rise to at least $5.50.

Prices of ferroalloys have been reaffirmed for the first quarter. A maker of high speed tool steel has announced unchanged prices for that period.

Makers of billet steel reinforcing bars are not interested in orders from distributors which net less than 1.90c. a lb., basing point, against which the resale price is usually 2.15c. There has been some talk that makers of rail steel bars may put their prices on a parity with billet steel bars.

Iron Ore

. . . Lake vessel movement to be continued as late as possible

During the first 10 days of this month vessel shipments of Lake Superior iron ore held at a high average. Most ship operators plan to run as long as possible this month. When further operation becomes impossible, considerable repair work will be started and at least one operator will increase vessel tonnage by raising hatches. The largest operator still is contemplating construction of three new vessels, but no appropriation has been put through yet, making it virtually impossible to have the proposed new ships ready for service at the start of the 1941 season, which probably will open earlier than usual.

Semi-Finished Steel

. . . British buying to increase
. . . Sales continue to gain

To the extent that mills can part with supplies, the volume of semi-finished steel specifications at PITTSBURGH is at top level. Skelp is moving rapidly and orders so far this month are moderately in excess of a month ago. Increased buying by the British has materialized within the past 10 days and bookings from that source are expected to expand steadily over the next several weeks.

At CLEVELAND sales of rerolling and forging billets and skelp up to Nov. 11 were approximately 25 per cent ahead of the incoming volume in the same part of October.

Bolts, Nuts and Rivets

. . . Shipments continue to rise
. . . New business heavy

Bolt and nut shipments, already ahead of the 1935-1939 average in both tonnage and dollar volume, continue to rise. CLEVELAND reports that heavy production will be maintained through December and well into the first quarter, because new business has been developing very rapidly. Cap screw manufacturers at CLEVELAND hold large order backlogs and experienced the best month since 1937 from the dollar sales standpoint during October. Some items formerly shipped quickly from stock now cannot be promised under ten days.

Pig Iron

. . . No other price advances . . .
Shipments very heavy

No other pig iron producer has followed the lead of the Pittsburgh Coke & Iron Co., which on Oct. 25 announced advances of $1.50 a ton on foundry, malleable and bessemer pig iron and $2 on basic pig iron at Sharpsville, Pa., and Youngstown. It does not appear likely that other producers will take similar action, the general expectation being that present prices will be reaffirmed for the first quarter.

Pig iron shipments are heavy, in many instances exceeding the "make" of merchant pig iron. While new business has not been of large proportions, this is of no significance in the present situation because many furnaces are in a sold-up condition and are not entertaining new orders except from regular customers.

PITTSBURGH pig iron producers which still have iron over and above their steel making requirements continue to take orders from regular consumers at present published prices. Carnegie-Illinois Steel Corp. is blowing in an additional furnace at Edgar Thomson works this week and the same company has added the third and last furnace at its Mingo Junction plant, this latter unit making bessemer iron. Merchant pig iron producers utilizing beehive coke either as a supplement to by-product material or as regular practice, will definitely pay about 50c. a ton more for their first quarter requirements than they paid for fourth quarter material.

CLEVELAND reports that November shipments are running ahead of the comparable part of October, which was one of the biggest months in recent history. From all indications the market there is still gathering momentum.

Expanding melting operations and, to a lesser degree, fear of priorities, are causing consumers in the Eastern area to exert considerable pressure on producers for delivery of material on order. No hindrance of operations due to lack of pig iron has yet developed, and it is doubtful if any shortage will actually occur for some time under present conditions.

Tubular Goods

. . . Sales ahead of a month ago.
. . . Army cantonments a factor

Although not reflecting the same tempo as some other steel products, tubular goods sales are moderately ahead of the same period a month ago, betterment being definitely reflected in oil country goods specifications, mechanical tubing and merchant pipe. The tremendous pickup in demand for standard pipe has brought into production units which had been idle for years and this latter condition has to some extent alleviated tightness in deliveries. The major portion of the improvement in merchant pipe requirements stems from the national defense program and the peak tonnage slated for such projects has yet to come. It is estimated that each army cantonment requires from 1000 to 1500 tons of merchant pipe, including building, gas and water piping. In some instances the tonnage required may run higher than these figures. Domestic customers who have not seen fit to lay in at least some merchant pipe might have to wait a while for delivery.

NEWPORT PRODUCTS

Hot Rolled Sheets • Newport Electrical Sheets • GOHI Pure Iron-Copper Alloy Sheets • Globe Brand Galvanized Steel Sheets, Roofing and Siding • GOHI Enameling Iron Sheets • KCB Copper Steel Sheets • Newport Long Terne Sheets • Newport Galvannealed and DeLuxe Metal Sheets.

LEADING enamelers quickly recognize the outstanding superiorities of GOHI Enameling Iron and the many production advantages made possible through its use, with the result that this fine metal is accorded top rating by those who demand the utmost in performance, whose manufacturing facilities are geared up to highest operating efficiency.

GOHI Enameling Iron is metallurgically pure, free from grease and pickle marks. The smooth, satiny surface holds the enamel tightly — many common enameling troubles are eliminated, and the appearance and longevity of the finished product are immeasurably improved.

THE NEWPORT ROLLING MILL CO.
NEWPORT KENTUCKY
DIVISION OF THE ANDREWS STEEL CO.

ANDREWS PRODUCTS IN CARBON AND ALLOY STEEL: Bars • Plates • Universal Mill Plates • Sheet Bars • Billets • Blooms • Slabs

Structural Steel

. . . Awards total 25,300 tons, new projects 37,925 tons

Fabricated structural steel awards at 25,300 tons compare with 32,300 tons last week. The largest lettings are 8000 tons for the Douglas Aircraft Co. plant at Long Beach, Cal.; 3600 tons for a bridge across the Mississippi River at Chester, Ill.; 1300 tons for a munitions filling plant at Edgewood, Md., and 1200 tons for a plant for the Kelsey-Hayes Wheel Co., at Plymouth, Mich.

New structural steel projects are higher at 37,925 tons against 20,400 tons a week ago. Sizable new inquiries include 12,496 tons at Buffalo for the Fairhaven Village apartment project; 8000 tons at East Pittsburgh, for buildings for the Westinghouse Electric & Mfg. Co.; 4000 tons for seven government warehouses at Ogden, Utah; 3000 tons for cracking towers for the Standard Oil Co. of New Jersey at Bayonne, N. J., Baton Rouge, La., and Baytown, Tex.; 1930 tons for highway bridges in Missouri; 1800 tons at Cicero, Ill., for a plant for the Danley Machine Specialties Co., and 1100 tons at Buffalo for a garage for the Fairhaven Village apartment project.

Wire Products

. . . Some mills booked into January on rods

Wire products consumers have been definitely more active than a month ago, according to reports from PITTSBURG mills. The improvement encompasses wire rods, various manufacturers wire items, and merchant wire products. Deliveries are becoming more extended.

Several OHIO mills are booked

up into January on popular sizes of rods. At CLEVELAND, where October orders for certain types of manufacturers wire were biggest of any month this year and comparable to the heavy fall months of 1939, demand continues strong. Large rods are in greatest demand. Sellers of merchant products report unusually heavy inquiries involving large tonnages of nails, mesh and fence were received in the past week in connection with the government cantonment program.

Delivery difficulties are being encountered by nail purchasers in the PHILADELPHIA district, chiefly because of heavy bookings for army cantonment building in the area.

Merchant Bars

. . . Orders heavier than a month ago, production at peak

With production records being hung up daily, fresh bar orders are being booked by PITTSBURGH mills in greater volume than a month ago. Miscellaneous and automotive buying continues heavy and national defense requirements, either direct or indirect, are increasing steadily. Finishing mills are occasionally hampered by inability to get billets and the complexity of current bar demand makes even short range planning futile in many instances. Deliveries are more extended than a week ago, especially on small bars and shapes.

Hot rolled carbon bar sales at CLEVELAND are heavy and predominantly for 1941 delivery. New tonnage so far this month is running approximately 20 per cent over the comparable part of October, including shell steel under 3 in., with special sections ahead by approximately the same margin and angles showing even greater gain. All consuming sources have been seeking tonnages, acting on the assumption that defense requirements will widen steadily. Obtaining 1940 deliveries on new orders is virtually impossible unless quantities and sizes happen to fit into mill schedules.

Though activity in bars, both carbon and alloy, has set the pace for most CHICAGO producers, this product has now given way to structurals at one important mill. Shell inquiries are increasing in that district, which is finally getting important defense business. One mill last week reported a sizable order for cold drawn material. Deliveries steadily lengthen. One steel maker announces that it cannot furnish anything before the middle of December and that only in flats, while other sizes cannot be promised before the first of the year.

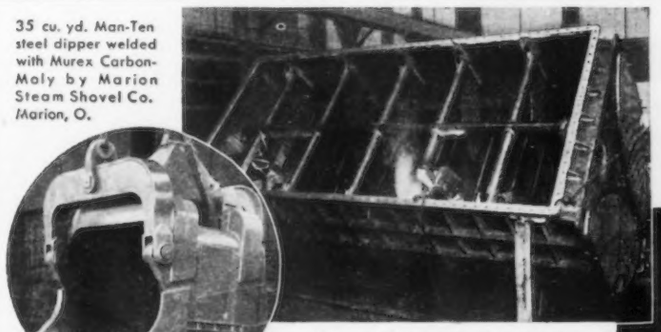
Jobber buying, which has been much heavier than usual, was an important factor in an active PHILADELPHIA bar market during the past week.

Plates

. . . Deliveries on non-military work usually about Jan. 1

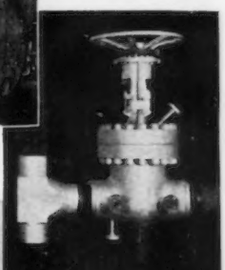
With most new business being taken at price at time of shipment and with deliveries usually extended until after the first of the year, plate sales at PITTSBURGH the early part of this month were substantially in greater volume than a month ago. Freight car and ship building, miscellaneous and na-

35 cu. yd. Man-Ten steel dipper welded with Murex Carbon-Moly by Marion Steam Shovel Co. Marion, O.



Murex-welded shell and turbine connector built by Ross Heater & Mfg. Co Buffalo.

High pressure piping welded with Murex Carbon-Moly by Geo. C. Limbert & Co., Chicago.



SPEED UP YOUR WELDING OF HIGH STRENGTH—LOW ALLOYS WITH MUREX ELECTRODES

SPECIALLY DESIGNED FOR CARBON-MOLY, COR-TEN, MAYARI, CROMANSIL, 2%-3% NICKEL AND OTHER STEELS

Accumulator built of A. S. T. M. A-203, Grade B steel by Black, Sivalls & Bryson, Oklahoma City. Welded with Murex Nickel Steel.

- The Murex line includes a group of specially developed rods designed to produce welds with tensile strengths ranging from 70,000 to 100,000 lbs. per sq. in.; ductilities of 20% to 30% and corrosion and heat resisting qualities matching closely any of the more widely used new steels. Because of their excellent deposition rates at high amperages, their ease of handling by skilled welders, and the assurance they provide of cleaner, smoother deposits they step up welding speeds and help hold down costs.

Ask to have Murex Electrodes demonstrated on your high strength—low alloy applications. A note to the nearest M & T office will bring a representative promptly.

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N. Y.
Albany • Chicago • Cincinnati • Detroit • Minneapolis • Pittsburgh
So. San Francisco • Toronto

"Murex Electrodes—Thermit Welding—Thermit Metal & Alloys"

Investigate Thermit Welding, too—in use since 1902 for heavy repair work; crankshafts, housings, frames, etc.

MUREX HEAVY COATED Electrodes
A COMPLETE LINE FOR EVERY WELDING APPLICATION

tional defense demand characterizes the present market.

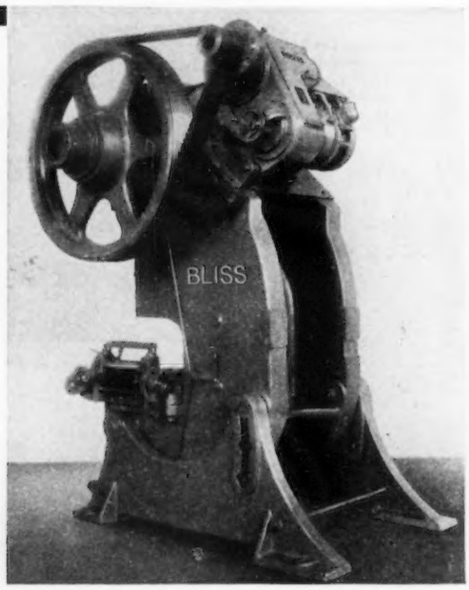
Delivery promises are being extended at CLEVELAND, where new tonnage has been coming in at a strong rate since late October. Orders up to Nov. 11 showed a 20 per cent gain over the same period in October. The principal wide plate producer is greatly extended on shipments.

At Chicago practically all mills are booked until the first of the year.

Demand continues very active in NEW YORK, where average daily bookings thus far this month have been in excess of the October daily average.

While no announcements have been made of first quarter prices, some mills are accepting business for first quarter shipment at present prices, while other mills are quoting prices in effect at time of shipment on such first quarter business.

The Exact Speed You Need



for Every Job

● It is no trick at all to adjust the operating speed of this Automatic Roll Feed Press to every change in materials or work schedules. The operator simply turns the handwheel on the REEVES Motodrive for any speed he needs. This is but one unit in the complete line of REEVES Variable Speed Control units. More than 120,000 REEVES units are now in use on all types of industrial machines. The manufacturers of 1321 different machines have adopted REEVES Speed Control as standard equipment. The same infinitely variable, accurate and positive units are available for installation on machines in service. Write for Catalog G-397. It will enable you to select the exact size and type of unit for your particular job.

REEVES PULLEY COMPANY, *Dept. I,* **COLUMBUS, INDIANA**

Reeves Speed Control

Sheets and Strip

. . . These products are now among the most active

Running substantially ahead of aggregate tonnage booked in the same period a month ago, sheets and strip at PITTSBURGH are ranking among the most active products. Aside from miscellaneous requirements, fairly large purchases have been made within the past 10 days by the automotive industry.

Flat rolled products have sharply turned upward at CHICAGO owing to an awakening of the possibility of priorities and a rush to get future needs on the books. Auto manufacturers, with a weekly production at 25 per cent ahead of last year, and refrigerator manufacturers, getting ready for new models, are leaders in the sheet bookings that are increasing from a strong general demand. Deliveries are lengthening—strip 2½ in. and under now quoted at two to three weeks and wide strip 2½ in. to 8 in. is promised within five to six weeks. Galvanized sheet deliveries have lengthened considerably, promises extending from seven to 12 weeks, depending on the producer. Hot and cold rolled sheets range from four to nine weeks.

At CLEVELAND and YOUNGSTOWN delivery promises on sheets are now in late December despite rising shipments. In addition to heavy recent automotive specifications, diversified consumers have been seeking protection on their estimated requirements. Difficulty in obtaining fill-in tonnages promptly has been experienced by the automotive industry.

Railroad Buying

. . . 30 locomotives ordered for export . . . 1302 freight cars bought

Motive power equipment purchases took the spotlight in the railroad market in the past week, with 30 locomotives for export reported purchased. Freight car purchases reported in the week totaled 1302 cars.

An export order for 26 locomotives was placed by the Ministry of Transportation and Public Works of Brazil and was divided equally between Baldwin Locomotive Works and American Locomotive Co. The Brazilian and Bolivion governments have placed orders for four Mogul-type locomotives with Vulcan Iron Works.

Rock Island is expected to purchase four diesel locomotives and Texas Pacific-Missouri Pacific Terminal is inquiring for one diesel-electric switcher.

Freight car purchases include 500 box cars awarded to Pressed Steel Car Co. by Denver, Rio Grande Western and 300 hopper cars placed with Pressed Steel Car Co. by Lehigh & New England. Wheeling & Lake Erie has awarded 302 box cars to Pullman Standard Car Mfg. Co., and 200 box cars to American Car & Foundry Co.

Norfolk Southern is taking bids on 350 freight cars.

Wheeling & Lake Erie has awarded 3000 tons of rails to Carnegie-Illinois Steel Corp.

Coke

. . . Beehive furnace grade up 50c., may go higher

With some first quarter contracts having already been made for standard beehive furnace coke at $5 and $5.25 a ton f.o.b. Connellsville and with spot business already bringing those prices, this grade is now quotable at that range, an advance of 50c. a ton. Before long some sources expect the top figure to be $5.50. It is understood the leading steel interest in western Pennsylvania which had been buying beehive coke from independent sources at $4.25 a ton to supplement its by-product supplies, has signed contracts at $5 a ton for first quarter delivery. The higher price level of beehive coke is expected to expedite the bringing in of additional ovens and will increase costs for merchant pig iron producers.

There are slightly more than 5400 beehive coke ovens in operation in the Connellsville, Latrobe, Greensburg and Gallitzin, Pa., districts.

An Eastern producer of spiegeleisen is seeking a source of supply for about 5000 tons of coke a month over an extended period.

Tin Plate

. . . Operations higher . . . Cold reduced at 73%

Tin plate operations this week are estimated at 48 per cent, up two points from a week ago while cold reduction mills are believed to be running at approximately 73 per cent of capacity.

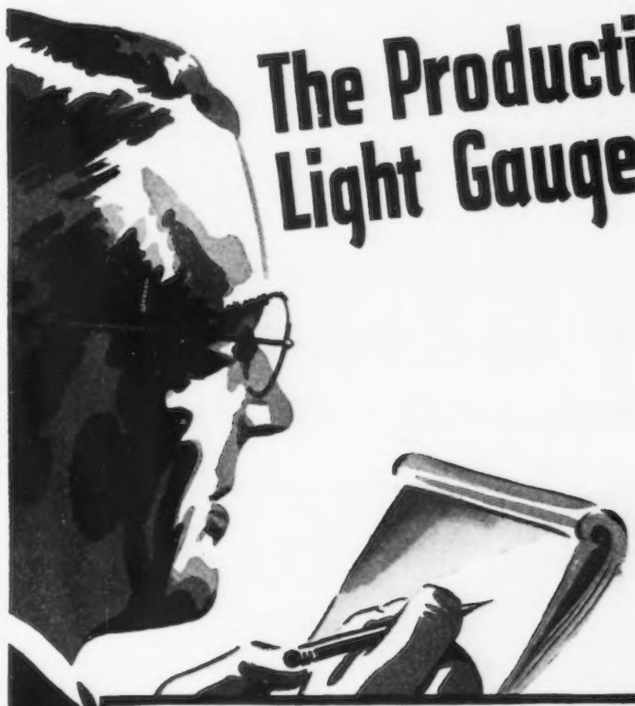
Shipbuilding

. . . Great Britain's program in U. S. would take 400,000 tons of steel

Great Britain's projected $100,000,000 shipbuilding program calling for an estimated 120 freighters to be built in this country may require a total of 400,000 tons of steel.

SPEED UP

The Production Of Light Gauge Metal



INSTALL "Pittsburgh" Spiral Wound Brushes in your continuous strip production lines. They'll pay for themselves—many times over!—in the *time* and *money* they save.

Investigate! "Pittsburgh" Spiral Wound Brushes are available in various fills—horsehair, tampico, and nickel silver wire. Consult with the "Pittsburgh" Man.

Our field representative is a trained technician who understands finishing problems. Talk with him. He will gladly work with you in developing "Pittsburgh" Spiral Wound Brushes to meet your specific production requirements.

Write or phone for futher information.

PITTSBURGH
PLATE GLASS COMPANY
BRUSH DIVISION • BALTIMORE, MD.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

New Project on Increase

Detroit

• • • **Daily the volume** of new projects, especially those linked with the defense program, is increased by the announcements of new and bigger programs. Not yet announced, but due for detailed statement shortly, is the fact that Buick will tool up a new plant at Flint for the manufacture of Pratt & Whitney aircraft engines. Last week Packard stated that output of its 1350-hp. marine engine will be increased from one to five per day following expenditure immediately of $700,000 for machine tools. These engines are being built for the United States Navy and the British and Canadian governments to power 50-ft. torpedo-equipped mosquito boats. With an order for $8,825,040 worth of 75-mm. shells, Willys Overland Motors, Inc., at Toledo, will require 70,000 sq. ft. of floor space and 100 new milling and forging machines.

Expenditure of $35,000 of which a major portion will go for equipment will be made immediately by Aeronautical Products, Inc., Detroit. The company is now acting principally as a sub-contractor on aircraft parts. It is also reported that Martin Electric Co. intends to equip a machine shop to assist in the tooling of defense industry.

Continued Strong Demand Seen

Cleveland

• • • **With the election over,** pressure is being increased upon all types of manufacturing industries to participate in government business. This development apparently points toward continued strong demand for machine tools.

Warner & Swasey Co., maker of turret lathes, has an order backlog amounting to more than $2,000,000. Press manufacturers hold the largest order volume since the World War and demand is still gathering momentum with shell case work very prominent among new business.

Half a dozen large government contracts for shell making are nearly ready to pop. Thompson Products, Inc., large aircraft parts maker, is still trying to arrange financing for a proposed large new plant.

Pressure To Expand Remains

Cincinnati

• • • **The level of machinery** bookings in the southern Ohio district continue at an almost monotonously high rate. With order books already bulging and production schedules crowded well into the next year, machinery users are steadily in the market for more and more equipment. Dealers in used machinery are also benefiting by brisk purchasing of all kinds of tools.

Production problems, of course, are still hanging around the question of plant expansion and an increased supply of skilled labor. Plant expansion programs are still under consideration and, with the election out of the way, it is probable that these will receive more serious thought.

Buy For Bomb Sight Mfr.

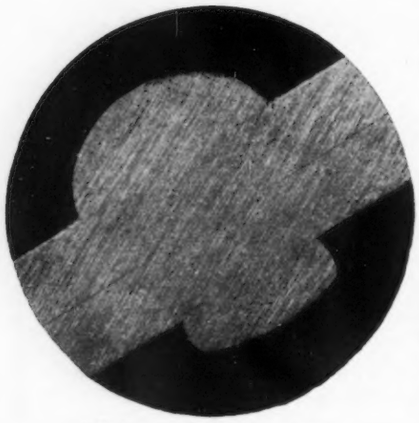
New York

• • • **At least two firms** in this area are buying equipment for the manufacture of aircraft bomb sights, one of them the highly secret Navy instrument, the other licensed for general export. It is understood that the former project has been given an AA-1 priority, first to be issued in this territory and placing it ahead of all other defense work.

1500 (average) rigid joints per hour

3200 (maximum)

Handled on the RIVITOR, your riveting job's approach to this maximum is governed by the ease with which the work can be handled.



This is a 1/4" dia. rivet joint section showing the preferred type of joint accomplished on the RIVITOR.

Exactly how a preferred type of solid rivet joint is accomplished at these rates is shown in our new RIVITOR Bulletin R-4 in addition to complete specifications of standard type RIVITORS. Typical toolings are illustrated and described, some of which serve as an assembly unit (besides holding the work for the actual riveting operation) to still further increase production. *Your copy of the Bulletin will be sent promptly. Address - -*

THE TOMKINS-JOHNSON CO.

628 North Mechanic Street **Jackson, Michigan**

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, Nov. 12—Most noteworthy features of the major nonferrous markets in the past week were two further advances in lead prices, raising quotations from 5.50c. per lb., delivered New York, to 5.80c. The tin market became moderately active during the week, rising ⅛c. per lb. Developments in the zinc and copper markets were in the direction of still greater tightness, particularly in the former metal, where statistics showed very low stocks. Rationing continues as producers attempt to satisfy the more urgent requirements. Activity in the copper market was in good volume during the week but tapered off slightly at the beginning of the current period. All major factors adhered to the price of 12c. per lb. for electrolytic copper, delivered Valley. Moderate export business was done at 10c. per lb., f.a.s.

Lead

Unable to withstand the strain of constant buying pressure which showed no signs of letting up, the market finally yielded and moved upward in two price changes closely following each other in the past week. On Wednesday all major factors raised their selling price $3 per ton to a basis of 5.65c. per lb., delivered New York, at which position it remained until Friday, when the sellers, who reported consumer demand undiminished as a result of the first advance, again revised their prices upward to 5.80c. per lb. Neither price advance seemed to have any effect in slowing consumers' demands. Sellers regularly had to carry considerable volumes of business over a day, and by the end of the week additions had been made to already lengthy waiting lists. As the present week opened, however, sellers noticed some slackening.

Sales on Tuesday were in moderate volume and mostly for carload lots.

November is now, with the exception of the usual small scattered tonnages, just about all accounted for, while December positions are also almost completely sold out.

Zinc

Domestic slab zinc statistics for October appearing during the past week coincided fairly closely with previous estimates. Stocks showed a further drop of 8365 tons to 22,600 tons at the end of the month, the smallest supply on hand since December, 1926, when stocks totaled 21,887 tons. Production rose to 56,442 tons, an increase of 3303 over September figure of 53,119 tons. Having been in excess of production for some time, shipments during October declined 2037 tons to 64,787 tons, as compared with total deliveries of 66,824 tons in September. Present stocks, on the basis of current shipments, are sufficient to satisfy only a little more than a week's requirements. With prices firm at 7.64c. per lb., delivered New York, the only development in the prime Western market during the past week was an even tighter supply situation. Estimates of a comparatively light sales volume for the week previous proved to be false when figures covering the period showed a total sales volume of 18,965 tons.

Tin

Negotiations closed during the past week provide for the purchase by the Metals Reserve Corp., from Bolivian producers, of ores and concentrates to equal 18,000 tons of fine tin annually, for the next five years. The market was a little more active in the past week following the close of the election and, on the strength of a small buying flurry, prices advanced ⅛c. Earlier, the price of prompt Straits metal had declined to 50.875c., delivered New York, but as the week progressed it rose to 51c., the present level.

GRAND RAPIDS

HYDR·AULIC FEED SURFACE GRINDERS

Feature

Heavy Rugged One Piece Column and Base

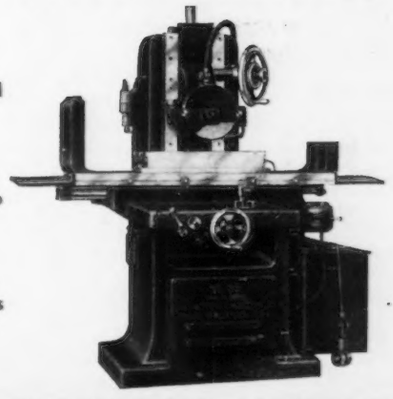
Two Spindle Speeds

Infinite Number of Table Speeds up to 125 F.P.M.

Patented movement of Wheel Head

Tool Room Accuracy at Production Speeds

Pulletins on Request



GALLMEYER & LIVINGSTON CO.

200 STRAIGHT AVE., S.W.

GRAND RAPIDS MICHIGAN

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

After holding unchanged for four weeks at $20.67, THE IRON AGE scrap price composite advanced 8c. this week to $20.75, a new high for the current year and comparing with a peak of $22.50 in 1939, recorded in the week of Oct. 3. The composites gain this week is due to an advance of 25c. at Chicago, the first price movement there in a month. Quotations on No. 1 steel at Pittsburgh and Philadelphia, while strongly supported by current trading, are unchanged this week.

Fundamentally the market is very firm, but some conflict of trends has developed in the individual markets due primarily to particular local conditions. Nearly half the Detroit prices are off 50c. this week, while on the other hand the entire list at Cincinnati is up 50c. Higher levels in some items were also reported at Buffalo, Boston, Philadelphia and Chicago.

Demand for cast items and electric furnace material is especially active and advances in prices on these items have accounted for the bulk of the price movements in recent weeks. The export movement in the east has shrunk to the lowest level reached in a long while but heavier shipments are expected to start in December. Outside of the elimination of premiums for export material, the slackening in shipments abroad has not yet had any adverse effect on market sentiment. The heavy domestic demand has acted to absorb all supplies previously shipped abroad.

Pittsburgh

The market undertone continues strong, No. 1 heavy melting being definitely unchanged at $21 to $22, sales into consumption having been made within this range in the past week. The greater portion of the Pennsylvania heavy melting steel was sold into consumption at around $23 a ton with a very small amount bringing a higher price. The Pittsburgh & Lake Erie heavy melting was sold here to a broker at around $22 a ton and is slated to be consumed in the Youngstown district. Railroad heavy melting steel remains quotably unchanged this week at $22.50 to $23, thereby reflecting the preponderance of activity in this grade in this district.

Chicago

On the basis of broker-dealer transactions, No. 1 heavy melting is quoted this week at $19.75 to $20.25, the first price move in either direction in a month. At the same time, several other items have moved upward on a similar basis. Mill purchases are still slow though the trade expects renewed activity shortly. A very firm undertone characterizes the general market here.

Birmingham

No. 1 cast grade and stove plate are showing added strength here with a resultant price advance of $1 a ton. Foundries and mills are beginning to feel effects of boat shipments of scrap to other areas. Memphis and Nashville scrap is being moved by barge to the Pittsburgh district and supplies for local consumption are decreasing.

Cincinnati

Dealer bids here are up 50c. on all items, with reports that railroad lists are bringing even higher prices. Movement of scrap on contract continues at good rate, while foundry grades continue to show an active demand. Mills continue to exert pressure against rising material costs, but dealers feel that further rise in quotations is imperative to attract sufficient material to care for anticipated needs.

St. Louis

Heavy melting steel grades are unchanged this week, although some specialties are 50c. higher. The market is strong on buying by dealers to cover short interests. Mills, however, are buying very little.

Detroit

Not more than four or five weeks off is a definite realinement of scrap prices in the Detroit area which will be brought about by the final closing of the navigation season. Blast furnace scrap particularly is expected to be involved in a readjustment as there is no immediate market for the material and the differential between water rates and rail rates to Cleveland, principal consuming point, will have to be taken care of if the material is to move during the winter months. Nearly half of the items quoted in Detroit have dropped 50c. a ton during the past week and some shakiness is reported in a few other items.

Philadelphia

Mill buying of notable proportions remained absent from the market during the week and prices of prime steel-making grades are unchanged. A noticeable tightening in cast scrap supplies was reflected in upward price revisions. Cast iron carwheels are now quoted at $23 to $23.50, heavy breakable cast at $21.50 flat, and stove plate at $18 to $18.50, on the basis of recent sales.

Youngstown

On the small transactions which have made up the going market here recently, current published quotations appear to be substantiated. Scrap is coming out freely and at the middle of last week an unusually large number of cars were on track in this vicinity representing old orders. Limitations are still in force at one or two points.

Cleveland

Continued quiet describes the market here. Published prices are nominal for the most part and unchanged. Transactions are not entirely lacking, but are small generally.

Buffalo

On the basis of sales of 5000 tons of No. 1 heavy melting steel within the $20.50 to $21 range, major scrap items moved up 50c. this week. Dealers report indications of additional price strengthening are pronounced with quotations likely to move up again before the end of the week. An active market and constant demand for specialties and low phosphorous plate account for rises of 50c. and $1 respectively, in quotations for these items. At least one local mill has done considerable undercover buying outside Buffalo at prices higher than those quoted locally.

New York

Excepting an increase of 50c. in stove plate, a reflection of the increased demand for cast items in eastern Pennsylvania, prices here are unchanged this week. The export movement has dwindled to almost nothing thus far this month, but it is believed that shipments will be intensified in the near future. Shipments to domestic mills continue at a high level and are preventing the accumulation of any large stocks at dealers' yards.

Boston

Shipments are somewhat freer than previously, but not really active. Yards report no difficulty in selling material, but are inclined to hold for better prices. However, breakable cast is moving in volume to eastern Pennsylvania generally at $15.50 on cars, while a Massachusetts consumer is taking No. 2 cast at around $17 delivered. One eastern Pennsylvania steel mill continues to offer $8.50 on cars for blast furnace material but is obtaining little. A Massachusetts consumer is paying $8.25 on cars for such material. For eastern Pennsylvania, $13 to $13.15 on cars is offered for bundled skeleton, and for other points, $12 to $12.25. Average stove plate sales are $12.75 on cars, but $12.50 as well as $13 was done this week. A boat will finish loading 4200 tons of scrap here for England this week, the first lot to go forward in several weeks.

Toronto

Heavy demand continues throughout the markets here. Large tonnages are pouring into yards with additional large supplies moving directly between producing and consuming plants, but despite this inflow of scrap, consumer demands are far from being satisfied. Dealers are generally taking orders for day-to-day delivery.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$21.00 to $22.00
Railroad heavy mltng.	22.50 to 23.00
No. 2 heavy melting..	19.50 to 20.50
Railroad scrap rails...	23.00 to 23.50
Rails 2 ft. and under..	27.00 to 27.50
Comp. sheet steel.....	21.00 to 22.00
Hand bundled sheets..	20.00 to 21.00
Heavy steel axle turn.	20.75 to 21.25
Heavy steel forge turn	19.75 to 20.25
Machine shop turnings	15.50 to 16.00
Short Shov. Turn. Alloy Free	17.00 to 17.50
Mixed bor. & turn....	14.75 to 15.25
Cast iron borings	15.00 to 15.50
Cast iron carwheels...	22.50 to 23.50
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast.....	22.00 to 22.50
RR. knuckles & coup..	27.50 to 28.00
Rail coil springs.....	27.50 to 28.00
Rail leaf springs.....	27.50 to 28.00
Rolled steel wheels...	27.50 to 28.00
Low phos. billet crops.	27.00 to 27.50
Low phos. punchings.	27.00 to 27.50
Low phos. heavy plate.	25.00 to 26.00
Railroad malleable ...	24.50 to 25.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.50 to $21.00
No. 2 hvy. mltng. steel.	19.50 to 20.00
Hydraulic bund., new.	20.50 to 21.00
Hydraulic bund., old..	17.50 to 18.00
Steel rails for rolling.	25.00 to 26.00
Cast iron carwheels..	23.00 to 23.50
Hvy. breakable cast..	.... 21.50
No. 1 cupola cast.....	22.50 to 23.00
Mixed yard (f'd'y) cast	.... 19.50
Stove plate (steel wks.)	18.00 to 18.50
Railroad malleable	22.50 to 23.00
Machine shop turn....	14.50 to 15.00
No. 1 blast furnace...	13.00 to 13.50
Cast borings	14.50 to 15.00
Heavy axle turnings..	19.00 to 19.50
No. 1 low phos. hvy...	25.50 to 26.00
Couplers & knuckles..	25.50 to 26.00
Rolled steel wheels...	25.50 to 26.00
Steel axles	25.00 to 25.50
Shafting	25.00 to 25.50
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.).	.... 15.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$19.75 to $20.25
Auto. hvy. mltng. steel alloy free	18.75 to 19.25
No. 2 auto steel.....	16.50 to 17.00
Shoveling steel	19.50 to 20.00
Factory bundles	19.25 to 19.75
Dealers' bundles	17.75 to 18.25
No. 1 busheling	18.75 to 19.25
No. 2 busheling, old..	11.50 to 12.00
Rolled carwheels	23.25 to 23.75
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs.	23.00 to 23.50
Steel coup. & knuckles.	23.00 to 23.50
Axle turnings	19.00 to 19.50
Coil springs	24.00 to 24.50
Axle turn. (elec.).....	19.75 to 20.00
Los phos. punchings..	23.00 to 23.50
Low phos. plates 12 in. and under	22.50 to 23.00
Cast iron borings	13.25 to 13.75
Short shov. turn.	14.00 to 14.50
Machine shop turn....	14.25 to 14.75
Rerolling rails	24.00 to 24.50
Steel rails under 3 ft..	23.00 to 23.50
Steel rails under 2 ft..	23.50 to 24.00
Angle bars steel	22.50 to 23.00
Cast iron carwheels ...	20.50 to 21.00
Railroad malleable ...	23.25 to 23.75
Agric. malleable	17.50 to 18.00
	Per Net Ton
Iron car axles	$24.50 to $25.00
Steel car axles	24.00 to 24.50
Locomotive tires	18.00 to 18.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast..	17.50 to 18.00
Clean auto. blocks ...	18.00 to 18.50
No. 1 railroad cast....	17.00 to 17.50
No. 1 agric. cast.....	16.00 to 16.50
Stove plate	13.00 to 13.50
Grate bars	14.00 to 14.50
Brake shoes	14.25 to 14.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$21.50 to $22.00
No. 2 hvy. mltng. steel.	20.50 to 21.00
Low phos. plate	24.00 to 24.50
No. 1 busheling	20.75 to 21.25
Hydraulic bundles	21.00 to 21.50
Machine shop turn....	14.00 to 14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	19.50 to 20.00
Comp. sheet steel.....	$20.00 to $20.50
Light bund. stampings	16.50 to 17.00
Drop forge flashings..	19.25 to 19.75
Machine shop turn....	12.50 to 13.00
Short shov. turn.....	13.00 to 13.50
No. 1 busheling	19.75 to 20.25
Steel axle turnings....	20.00 to 20.50
Low phos. billet and bloom crops	25.00 to 25.50
Cast iron borings.....	14.00 to 14.50
Mixed bor. & turn.....	14.00 to 14.50
No. 2 busheling	14.00 to 14.50
No. 1 cupola cast.....	22.00 to 22.50
Railroad grate bars...	15.50 to 16.00
Stove plate	15.50 to 16.00
Rails under 3 ft.	25.50 to 26.00
Rails for rolling.....	25.00 to 25.50
Railroad malleable ...	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Scrap rails	22.00 to 22.50
New hvy. b'ndled sheets	18.50 to 19.00
Old hydraul. bundles .	17.00 to 17.50
Drop forge flashings..	18.50 to 19.00
No. 1 busheling	18.50 to 19.00
Machine shop turn....	13.50 to 14.00
Shov. turnings	14.50 to 15.00
Mixed bor. & turn.....	13.50 to 14.00
Cast iron borings.....	13.50 to 14.00
Knuckles & couplers..	25.00 to 25.50
Coil & leaf springs....	25.00 to 25.50
Rolled steel wheels...	25.00 to 25.50
No. 1 machinery cast.	20.50 to 21.00
No. 1 cupola cast.....	19.00 to 19.50
Stove plate	17.00 to 17.50
Steel rails under 3 ft...	25.50 to 26.00
Cast iron carwheels...	18.50 to 19.50
Railroad malleable ...	22.50 to 23.50
Low phos. plate	26.00 to 27.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$17.00 to $17.50
No. 1 hvy. melting....	17.25 to 17.75
No. 2 hvy. melting.....	16.00 to 16.50
No. 1 locomotive tires.	20.50 to 21.00
Misc. stand. sec. rails.	20.75 to 21.25
Railroad springs	22.00 to 22.50
Bundled sheets	13.00 to 13.50
Cast bor. & turn.....	10.00 to 10.50
Machine shop turn....	11.00 to 11.50
Heavy turnings	13.25 to 13.75
Rails for rerolling.....	23.00 to 24.00
Steel car axles	24.00 to 24.50
No. 1 RR. wrought....	14.50 to 15.00
No. 2 RR. wrought....	16.50 to 17.00
Steel rails under 3 ft..	23.75 to 24.25
Steel angle bars	21.00 to 21.50
Cast iron carwheels...	20.50 to 21.00
No. 1 machinery cast..	19.50 to 20.00
Railroad malleable ...	20.50 to 21.00
Breakable cast	17.75 to 18.25
Stove plate	14.00 to 14.50
Grate bars	13.50 to 14.00
Brake shoes	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$16.75 to $17.25
No. 2 hvy. mltng. steel.	15.25 to 15.75
Scrap rails for mltng.	22.25 to 22.75
Loose sheet clippings.	12.00 to 12.50
Hyd'lic bundled sheets	16.00 to 16.50
Cast iron borings.....	8.25 to 8.75
Machine shop turn...	9.25 to 9.75
No. 1 busheling	12.75 to 13.25
No. 2 busheling	7.00 to 7.50
Rails for rolling	23.75 to 24.25
No. 1 locomotive tires.	19.00 to 19.50
Short rails	24.25 to 24.75
Cast iron carwheels..	18.25 to 18.75
No. 1 machinery cast..	20.75 to 21.25
No. 1 railroad cast....	19.25 to 19.75
Burnt cast	12.75 to 13.25
Stove plate	12.75 to 13.25
Agricul. malleable	17.25 to 17.75
Railroad malleable ...	20.25 to 20.75
Mixed hvy. cast.....	18.00 to 18.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	....	$18.00
No. 2 hvy. melting steel	....	17.00
No. 1 busheling	....	16.00
Scrap steel rails	....	17.00
Steel rails under 3 ft..	....	19.50
Rails for rolling	....	20.00
Long turnings	....	7.50
Cast iron borings	....	8.50
Stove plate	....	12.00
Steel axles	....	18.00
No. 1 RR. wrought....	....	16.00
No. 1 cast	....	18.00
No. 2 cast	....	13.00
Cast iron carwheels...	....	17.00
Steel carwheels	....	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting..	$16.00 to $16.50
No. 2 heavy melting..	15.00 to 15.50
Borings and turnings.	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Long turnings	9.50 to 10.00
Short shov. turnings..	12.00 to 12.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast...	14.50 to 15.00
Stove plate	12.00 to 12.50
Hydraul. comp. sheets.	18.00 to 18.50
New busheling	16.50 to 17.50
Sheet clips	14.00 to 14.50
Flashings	16.00 to 16.50
Low phos. plate	19.50 to 20.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Hvy. breakable cast...	17.00 to 17.50
No. 1 machinery cast.	18.50 to 19.00
No. 2 cast	15.50 to 16.00
Stove plate	13.50 to 14.00
Steel car axles	20.00 to 21.00
Shafting	20.00 to 20.50
No. 1 RR. wrought....	14.50 to 15.50
No. 1 wrought long...	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling.....	20.00 to 20.50
Clean steel turnings*..	10.00 to 10.50
Cast borings*	9.50 to 10.00
No. 1 blast furnace...	9.00 to 9.50
Cast borings (chem.)..	10.00 to 11.00
Unprepared yard scrap	8.50 to 9.00
Light iron	6.50 to 7.00

Per gross ton delivered local foundries:

No. 1 machin. cast....	$19.00 to $19.50
No. 2 cast	16.00 to 16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	$15.50 to $15.75
Machine shop turn....	9.25 to 9.75
Mixed bor. & turn.....	8.00 to 8.50
Bun. skeleton long....	12.50 to 13.00
Shafting	19.50 to 19.75
Stove plate	12.50 to 12.75
Cast bor. chemical	9.50 to 9.75

Per gross ton delivered consumers' yards:

Textile cast	$20.00 to $21.00
No. 1 machine cast....	20.00 to 20.75

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel.	$15.50 to $15.75
No. 2 steel	14.50 to 14.75

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.50	to	$14.00
No. 2 hvy. mltng. steel	$13.00		
Bundles	12.00		

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$12.50	$12.00
No. 1 hvy. mltng. steel.	11.25	10.75
No. 2 hvy. mltng. steel.	10.00	9.75
Mixed dealers steel...	8.75	8.25
Drop forge flashings...	9.75	9.25
New loose clippings...	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.50	7.00
Cast borings	7.50	7.00
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	15.25	14.75

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges	
No. 1 hvy. mltng. steel.	$16.00
No. 2 hvy. mltng. steel.	15.00
No. 2 cast	$15.00 to 15.50
Stove plate	13.00 to 13.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.....	$17.00
No. 2 hvy. mltng. steel.....	15.50
Rail (scrap)	17.00 to 17.25
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.....	Nominal
No. 2 hvy. mltng. steel.....	Nominal

Construction Steel

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 25,300 tons from 32,300 tons last week; new projects higher at 37,925 tons against 20,400 tons a week ago; plate awards total 5290 tons.

AWARDS

NORTH ATLANTIC STATES

1300 Tons, Edgewood, Md., munitions filling plant for Government, to Belmont Iron Works, Philadelphia.

875 Tons, Schenectady, N. Y., order and store building for General Electric Co., to American Bridge Co., Pittsburgh.

695 Tons, Picatinny Arsenal, N. J., warehouses, etc., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

610 Tons, New York, addition to St. Vincent's Hospital, to Harris Structural Steel Co., Plainfield, N. J.

535 Tons, Quonset Point, R. I., mess hall, to Harris Structural Steel Co., Plainfield, N. J.

400 Tons, New Haven, Conn., housing project, to Buffalo Steel Co., North Tonawanda, N. Y., through W. A. Connors, Hartford, Conn.

350 Tons, Ardmore, Pa., manufacturing building for Autocar Co., to Bethlehem Steel Co., Bethlehem, Pa.

300 Tons, New York, ash tower No. 1 for Consolidated Edison Co., to American Bridge Co., Pittsburgh.

290 Tons, Reading, Pa., addition to American Chain & Cable Co., to Reading Metalcraft Co., Reading, Pa.

280 Tons, Carteret, N. J., addition to Foster Wheeler Corp. plant, to Belmont Iron Works, Philadelphia.

270 Tons, York, Pa., building for McCrory Stores, Inc., to Bethlehem Contracting Co., Bethlehem, Pa.

250 Tons, Girard, Pa., factory building for Louis Marx Co., to R. S. McMannus Steel Construction Co., Inc., Buffalo, through Gilmore, Carmichael & Olsen, general contractors, Cleveland.

210 Tons, College Point, N. Y., Edo Aircraft building, to Grand Iron Works, New York.

206 Tons, Cambridge, Mass., Harvard University Rare Book Library, to A. O. Wilson Structural Co., Boston, through Fuller Construction Co., Boston, contractor.

200 Tons, Franklin, Pa., mill building for Joy Mfg. Co., to Truscon Steel Co., Youngstown.

185 Tons, Lester, Pa., machine shop extension, to Lehigh Structural Steel Co., Allentown, Pa.

179 Tons, East Pittsburgh, Pa., extension to machine shop for Westinghouse Electric & Mfg. Co., to Lehigh Structural Steel Co., Allentown, Pa.

160 Tons, Quonset Point, R. I., dispensary, to Belmont Iron Works, Philadelphia.

115 Tons, Harrisburg, Pa., Y.W.C.A. addition, to Reading Steel Products Co., Reading, Pa.

STRUCTURAL STEEL AWARDS

THE SOUTH

700 Tons, Gadsden, Ala., Government shell forging plant, to Southern Steel Works Co., Birmingham.

475 Tons, Institute, W. Va., health center, to L. Schreiber & Sons, Cincinnati.

400 Tons, Fort Knox, Ky., hangar for Air Corps, to Hansell-Elcock Co., Chicago.

180 Tons, Norfolk, Va., addition to Bell Telephone building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

176 Tons, Wilson County, Tex., highway bridge work, to North Texas Iron & Steel Co., Fort Worth, Tex.

140 Tons, Orange, Tex., mold loft, to Consolidated Steel Corp., San Francisco.

125 Tons, Harriman, Tenn., Caney Creek bridge for TVA, to American Bridge Co., Pittsburgh.

120 Tons, Galveston County, Tex., contract No. 389-6-2, to an unnamed fabricator.

CENTRAL STATES

3600 Tons, Chester, Ill., bridge over Mississippi River, to American Bridge Co., Pittsburgh.

1200 Tons, Plymouth, Mich., manufacturing building and power house for Kelsey-Hayes Wheel Co., to Wisconsin Bridge & Iron Co., Milwaukee.

640 Tons, Elyria, Ohio, building for Bendix-Westinghouse Automotive Air Brakes Co., to R. C. Mahon Co., Detroit.

870 Tons, Dunn County, Wis., State project No. 6234, to Milwaukee Bridge Co., Milwaukee.

294 Tons, Dayton, Ohio, plastics manufacturing building for Inland Mfg. Division, to Burger Iron Co., Dayton.

230 Tons, Allouez, Wis., ore dock spouts, etc., for Great Northern Railway Co., to American Bridge Co., Pittsburgh.

200 Tons, Lancaster, Ohio, building for Anchor Hocking Glass Co., to Indiana Bridge Co., Muncie, Ind.

200 Tons, Wright Field, Ohio, additional building, to Burger Iron Co., Akron, Ohio.

177 Tons, Detroit, extension to plant No. 4, Chevrolet Motors Co., to R. C. Mahon Co., Detroit.

127 Tons, Cleveland, building No. 113 for Aluminum Co. of America, to an unnamed fabricator.

WESTERN STATES

8000 Tons, Long Beach, Cal., plant for Douglas Aircraft Co., to Bethlehem Steel Co., San Francisco.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

12,496 Tons, Buffalo, Fairhaven Village apartment projects, including piling for nine apartment houses.

8000 Tons, East Pittsburgh, factory buildings for Westinghouse Electric & Mfg. Co.

3000 Tons, Bayonne, N. J., cracking towers at Bayonne, Baton Rouge, La., and Baytown, Tex., for Standard Oil Co. of New Jersey.

1100 Tons, Buffalo, garage for Fairhaven Village project.

800 Tons, Cheektowaga, N. Y., factory building for Houde Engineering Corp., Buffalo.

600 Tons, Hartford, Conn., building for Hartford hospital.

350 Tons, Philadelphia, alterations low craneways for Government.

325 Tons, Philadelphia, administration building, Frankford Arsenal.

315 Tons, Parlin, N. J., power house for Hercules Powder Co.

285 Tons, Brooklyn, pedestrian overpass, contract E-6, for Triboro Bridge Authority.

265 Tons, Elizabeth, N. J., generator house for Elizabethtown Consolidated Gas Co.

235 Tons, Edgewood, Md., shell assembly plant for Government.

200 Tons, Worcester, Mass., shipping building for Wyman Gordon Co.

200 Tons, Philadelphia, warehouse for U. S. Plywood Corp.

150 Tons, West Point, N. Y., dormitory addition for U. S. Military Academy, Irwin & Leighton, Philadelphia, general contractors.

110 Tons, Philadelphia, addition to artillery shell shop, building No. 55, for Army.

CENTRAL STATES

1938 Tons, State of Missouri, highway bridges; St. Louis County, 1241 tons; Wayne County, 437 tons; six other counties, 260 tons; bids Nov. 29.

1800 Tons, Cicero, Ill., manufacturing building for Danley Machine Specialties Co.

500 Tons, Cleveland, manufacturing building for Cleveland Graphite Bronze Co.

450 Tons, Bay City, Mich., factory building for Dow Chemical Co.

375 Tons, Cincinnati, Chesapeake & Ohio Railroad bridge.

170 Tons, Butler County, Ohio, State project No. 314; bids Nov. 15.

135 Tons, Chicago, mezzanine stations, subway, contract S-10-E.

120 Tons, Port Edwards, Wis., extension No. 7, paper machine building for Nekoosa-Edwards Paper Co.

Unstated tonnage, Cleveland, warehouse for Sears-Roebuck & Co.

WESTERN STATES

4000 Tons, Ogden, Utah, seven Government warehouses.

FABRICATED PLATES

AWARDS

3410 Tons, Dekalb Co., Ga., welded pipe, to American Rolling Mill Co., Middletown, Ohio.

1400 Tons, Leetsdale, Pa., 10 coal barges for Weirton Steel Co., to Dravo Corp., Pittsburgh.

215 Tons, Baltimore, punched plates, to Central Iron & Steel Co.

150 Tons, Philadelphia, welded buoys, to Acme Steel Engineering Co., Baltimore.

115 Tons, Sewalls Point, Va., mooring buoys, to Acme Steel Engineering Co., Baltimore.

Weekly Bookings of Construction Steel

Week Ended ——→	Nov. 12, 1940	Nov. 4, 1940	Oct. 15, 1940	Nov. 14, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	25,300	32,300	33,071	14,850	1,011,410	832,725
Fabricated plate awards	5,290	1,780	1,995	150	133,000	139,505
Steel sheet piling awards	0	175	0	1,500	65,180	75,365
Reinforcing bar awards	9,875	5,000	9,865	9,300	412,185	412,390
Total Letting of Construction Steel	40,465	39,255	44,931	25,800	1,621,775	1,459,985

Reinforcing Steel

Awards of 9875 tons; 6500 tons in new projects

AWARDS

ATLANTIC STATES

500 Tons, New Haven, Conn., housing project, to Buffalo Steel Co., Buffalo, through M. A. Connor Co., Hartford, Conn., contractor.

440 Tons, New York, contract No. 33, East River Drive, to Truscon Steel Co., Youngstown, through Nicholas DiMenna & Sons.

268 Tons, Great Bend, N. Y., Pine Camp temporary housing, to Truscon Steel Co., Youngstown, through John W. Cowper Co., Buffalo.

200 Tons, Lincoln-North Smithfield, R. I., mesh, State road, to Wickwire Spencer Steel Co., Worcester, Mass., through Gammino Construction Co., Providence, R. I., contractor.

136 Tons, Orange, Conn., bridge, to Truscon Steel Co., Youngstown, through Mariani Construction Co., New Haven, Conn.

100 Tons, Lincoln-North Smithfield, R. I., bars, State road, to Concrete Steel Co., Boston, through Gammino Construction Co., Providence, R. I., contractor.

SOUTH AND CENTRAL

5000 Tons, Ravenna, Ohio, bars for Portage County ammunition loading plant, to Paterson-Leitch Co., Cleveland, through Hunkin-Conkey Construction Co. (300 tons of mesh awarded to American Steel & Wire Co., Cleveland.)

600 Tons, Dayton, Ohio, plant for Delco Division, to Carnegie-Illinois Steel Corp., Pittsburgh.

500 Tons, Detroit, Herman Gardens housing project, to Truscon Steel Co., Youngstown, through Precast Units Co.

390 Tons, Columbus, Ohio, Rich Street housing project, to Calumet Steel Co., Chicago.

300 Tons, Akron, Ohio, Edgewood housing project, to Truscon Steel Co., Youngstown, through Lloyd Bros., Inc.

250 Tons, Minneapolis, agronomy building, University of Minnesota, to Cowin & Co., Minneapolis.

225 Tons, Hunt County, Tex., highway bridge work for State, to North Texas Iron & Steel Co., Fort Worth, Tex.

222 Tons, Portsmouth, Va., Swanson Homes housing project, to Truscon Steel Co., Youngstown, through William Muirhead Construction Co.

220 Tons, Chicago, Illinois Bell Exchange building, to Concrete Steel Co., Chicago.

175 Tons, Welch, W. Va., parking garage, to Jones & Laughlin Steel Corp., Pittsburgh, through Metzgar Richardson Co.

115 Tons, Durand, Wis., highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

111 Tons, Uvalde County, Tex., State project FAP 360-B, to Truscon Steel Co., Youngstown.

100 Tons, Columbus, Ohio, Lincoln Park housing project, to Pollak Steel Co., Cincinnati, through G. H. Whike Construction Co., Canton, Ohio.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1500 Tons, Cheektowaga, N. Y., Curtiss-Wright Corp. expansion; bids in.

200 Tons, Meriden-Berlin, Conn., mesh, section of route 5.

100 Tons, New Hartford, Conn., Hartford-Winsted road.

CENTRAL STATES

2000 Tons, Wilmington, Ill., duPont TNT plant; Stone & Webster Co. engineer and contractor.

1100 Tons, Lawrenceburg, Ind., Belvedere Corp. warehouse.

350 Tons, Massillon, Ohio, flood protection project.

250 Tons, Akron, Ohio, expansion for General Tire & Rubber Co.

200 Tons, Milwaukee, business administration building.

130 Tons, Rochester, Minn., Research laboratory.

100 Tons, Chicago, warehouse for Central Steel & Wire Co.

CANAL ZONE

563 Tons, Panama Canal; bids to be opened Nov. 18 at office of General Purchasing Officer, Washington.

Pipe Lines

Peoples Natural Gas Co., 545 William Penn Way, Pittsburgh, plans new welded steel pipe line from point in Hebron Township, Potter County, to compressor station in Limestone Township, Clarion County, about 90 miles, for natural gas transmission.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Nov. 18 for 4000 ft., ¼ to 2-in. black and galvanized steel pipe (Circular 591); also for 495 ft. of 6-in. cast iron water pipe, with bends, tees, sleeves, valves, etc. (Circular 588).

Public Utility District No. 1, Puget Sound, Wash., John S. Dickson, manager, care of H. L. Gilbert, Couch Building, Portland, consulting engineer, will take bids soon, to close on or about Dec. 2, for 85,000 ft. of 3, 4 and 6-in. steel pipe for water system in district, with alternate bids on concrete and wood stave pipe; also for elevated steel tank and tower, filtration plant and other waterworks installation.

Peoples Water & Gas Co., Columbus, Miss., plans extensions and improvements in pressure pipe line system for natural gas distribution, including replacements in different districts.

Thibodaux, La., has authorized bond issue of $175,000 for pressure pipe line system for natural gas distribution, including main welded steel pipe for connection with supply source. Work is scheduled to begin soon.

Houston Natural Gas Co., Petroleum Building, Houston, Tex., has let contract to Gayle Brothers, 808 Blodgett Street, for new 12 and 16-in. welded steel pipe lines from company loop line at Rusk and Hutchins to Houston city limits at Griggs Road and Long Drive, about six miles, for natural gas transmission. Cost close to $100,000.

General Purchasing Officer, Panama Canal, Washington, closes bids Nov. 20 for 8-in. seamless steel pipe; also steel pipe bends, steel pipe headers, special steel nipples, seamless steel U-bends, welding nipples, special steel pipe tees, gaskets, etc. (Schedule 4496).

Cast Iron Pipe

Department of Public Works, Wilmington, N. C., James E. L. Wade, commissioner, plans pipe line from King's Bluff, Cape Fear River, to city limits, for new main fresh water line.

Des Moines, Iowa, plans about 3600 ft. of 8-in. pipe for main water line from city to municipal airport. John M. Tippee is city engineer.

Weyauwega, Wis., plans pipe lines for water system; also other waterworks installation. Cost about $43,100. Financing in that amount has been arranged through Federal aid.

Midland, Tex., plans pipe line extensions in water system; also new pumping machinery and other waterworks installation. Cost about $50,000.

Water Department, St. Louis Park, Minn. (suburb of Minneapolis), plans pipe line extensions in water system and other waterworks installation. Cost about $120,000. Financing in that amount has been arranged through Federal aid.

Mansfield, La., plans pipe lines for water system and other waterworks installation. Cost about $85,000. Bond issue in that sum has been authorized. J. B. McCrary Co., Inc., Atlanta, Ga., is consulting engineer.

Creswell, N. C., plans pipe lines for water system. Fund of $58,900 is being arranged through Federal aid for this and sewage system, of which $25,000 will be represented by bond issue, to be voted at special election to be held soon.

Nixon, Tex., will take bids soon for pipe lines for water system and other waterworks installation; also for deep-well pumping machinery and accessory equipment. Cost about $34,000. Beavers & Loda, Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Sellersville, Pa., plans new 12-in. pipe for main water supply from reservoir to point near city limits, replacing an existing 6-in. line. Cost about $50,000.

Department of Water Supply, Gas and Electricity, Municipal Building, New York, plans pipe line extensions and replacements in water system in Brooklyn. Cost close to $375,000. Financing will be carried out through Federal aid.

Quartermaster, Fort Dix, N. J., asks bids until Nov. 18 for pipe line extensions in water system, from raw water pumping station at New Lisbon to filtration plant at Fort Dix (Circular 263-47).

Trade Notes

Hammond Machinery Builders, Inc., of Kalamazoo, Mich., announces the purchase of the automatic polishing and buffing machinery division of the Continental Roll & Steel Foundry Co., East Chicago, Ind., and its removal to Kalamazoo. The Continental Automatic line complements the Hammond line of larger Rotary and Strait Line Automatic Polishers and Buffers, as well as Hammond's complete line of all types of polishing and buffing lathes (or jacks) and grinders. Harold W. Faint, for years connected with the polishing and buffing wheel and equipment fields, and his assistant, Lawrence Major, are now with Hammond.

•

Spraying Systems Co., 4021-P W. Lake Street, Chicago, manufacturer of spray nozzles for industrial use, announce appointment of two new agents, F. R. Magill, 1807 First National Bank Bldg., Pittsburgh, and the Manufacturers' Supply Co., 1201 C Street, N. E., Washington, D. C.

•

Cleveland Pneumatic Tool Co., with factory and main office in Cleveland, has just completed the removal of its Detroit branch from the Insurance Exchange Building, where the office in charge of C. D. Garner has been for 20 years or more, to 213 East Columbia Street, Detroit.

•

Alberto Ubbelohde & Cia., Buenos Aires, Arg., and Montevideo, Uruguay, exporters and importers of metallurgical products, have organized Alberto Ubbelohde, Inc., with offices at 2 Rector Street, New York. Officers are Alberto Y. Ubbelohde, president, Jules Dierckx, vice-president, and T. Y. Lancaster, secretary and treasurer.

•

Cutler-Hammer, Inc., Milwaukee, manufacturers of motor control, safety switches and allied electrical equipment, announces the opening on Oct. 1, 1940, of its new factory, warehouse and sales office at 711 Potrero Ave., San Francisco.

•

King Machine Co., 815 W. Juneau Avenue, Milwaukee, has bought the building of the Wisconsin Gray Iron Foundry Co. at 4530 W. Burnham Street and is now putting up a $20,000 addition expected to be ready by the end of the year. The firm does a general machine jobbing business.

•

Northern Metal & Roofing Co., Green Bay, Wis., has increased its capital stock from $15,000 to $50,000, according to M. L. Van Lannen, president. Founded in 1931 the firm deals in roofing, sheet metal products, automatic heating and air condition equipment.

•

Sales division of Toledo Steel Products Co. has established new offices on the twentieth floor of Second National Bank building here. J. E. Adams is general sales manager. Sales have gained more than 200 per cent in the last five years, Mr. Adams reported. The company now operates 25 warehouse branches in principal cities.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / ↓ Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG.															
Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 4/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	68
9/16 and ⅝ in. by 6 in. and shorter	66
¾ to 1 in. by 6 in. and shorter	64
1⅛ in. and larger, all lengths	62
All diameters over 6 in. long	62
Lag, all sizes	65
Plow bolts	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	66
9/16 to 1 in. inclusive	63
1⅛ in. to 1½ inclusive	61
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	66	70
9/16 to 1 in.	63	65
1⅛ in. through 1½ in.	61	62
1⅝ in. and larger	60	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	72½ and 10
Stove bolts in packages, with nuts attached	72½
Stove bolts in bulk	82

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 6	Nov. 7	Nov. 8	Nov. 9	Nov. 12
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00
Copper Lake	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York	50.875	50.875	51.00	....	51.00
Zinc, East St. Louis[2]	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.50	5.50	5.65	5.65	5.65

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	52.25	54.50
Copper		
Electro	12.75	14.00
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	8.50	8.10
Sheets, No. 9 casks	12.50	14.00
Lead		
American pig	6.75	6.25
Bar	8.45	8.90
Cut sheets	8.80	9.15
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.375	32.25
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	9.75	10.375
Hvy. and wire	8.75	9.15
Light and bottoms	7.75	8.25
Brass		
Heavy	5.50	6.005
Light	4.50	5.250
No. 1 yel. turn.	5.25	6.25
No. 1 red or compo. turnings	8.625	9.125
Hvy. Mach. compo.	9.00	9.375
Lead		
Heavy	4.75	5.25
Aluminum		
Cast	10.00	11.00
Sheet	13.00	14.00
Zinc	4.375	5.125

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cents plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $169-$171 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras; on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade .....3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

ACCURATELY CONTROLLED

air

FOR COMBUSTION

Positive delivery of a known volume of air is a characteristic of Roots-Connersville Rotary Positive Blowers of particular value on heat treating furnaces, foundry cupolas and other applications where combustion must be under accurate control.

In any expansion or modernization of plant facilities called for by today's urgent demand for increased production capacity, you will profit by putting Roots blowers to work wherever AIR is needed for combustion. They offer the double advantage of simple, accurate control and the assurance of dependable performance under the most exacting demands of long continued operation.

Pressures from 8 oz to 15 lbs. and volumes from 5 to 50,000 CFM. Ask for complete information on the blower you need.

IN HANDLING AIR AND GAS Experience Counts SINCE 1854

Roots CONNERSVILLE BLOWER CORPORATION

411 OHIO AVENUE CONNERSVILLE, IND.

NEW YORK CHICAGO POTTSTOWN, PA. SAN FRANCISCO
DETROIT ST. LOUIS LOS ANGELES PITTSBURGH BOSTON

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d.	13 B.W.G. $9.01	$7.82	....
1¼ in. o.d.	13 B.W.G. 10.67	9.26	....
1½ in. o.d.	13 B.W.G. 11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G. 13.42	11.64	11.06
2 in. o.d.	13 B.W.G. 15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G. 16.76	14.54	13.79
2¼ in. o.d.	12 B.W.G. 18.45	16.01	15.16
2½ in. o.d.	12 B.W.G. 20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G. 21.42	18.59	17.54
3 in. o.d.	12 B.W.G. 22.48	19.50	18.35
3½ in. o.d.	11 B.W.G. 28.37	24.62	23.15
4 in. o.d.	10 B.W.G. 35.20	30.54	28.66
4½ in. o.d.	10 B.W.G. 43.04	37.35	35.22
5 in. o.d.	9 B.W.G. 54.01	46.87	44.25
6 in. o.d.	7 B.W.G. 82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft, to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+10
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60

Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

NEW ELECTRIC HOIST CATALOG!

"144 ANSWERS TO YOUR HOISTING PROBLEMS"

Here is something *really new.*

This latest READING Catalog describes Reading's new *Unit Construction Plan* of hoist manufacture. With this plan you can practically design your own hoist to meet your own problems—*using standard interchangeable units at standard prices.* 144 combinations possible in each capacity from ½ to 2 tons.

This catalog is complete. Gives full details—photographs — drawings — specifications — dimensions.

Without obligation, mail this coupon for your free copy.

READING

Electric Hoists, Cranes, Monorails and Chain Hoists

FREE IN U. S. A.

The Reading Chain & Block Corporation, Dept. 25, Reading, Pa.

Gentlemen: Without obligation, please send me "144 Answers"—your new Electric Hoist Catalog.

NAME.....TITLE.....
(Please Print)

FIRM.....
(Firm Name Must Be Given)

ADDRESS.....

CITY.....STATE.....

ORES

Lake Superior Ores

Delivered Lower Lake Ports

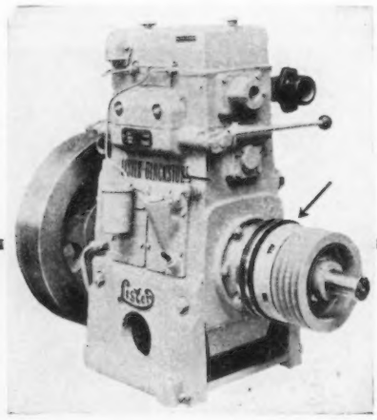
	Per Gross Ton
Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%.....	4.60
Mesaba, non-bessemer, 51.50%.	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive or Duty

	Per Unit
Algerian, low P, Cu free, dry, 55 to 58% Fe	Nom.
Caucasian, washed, 52% Mn.	Nom.
African, Indian, 44 to 48% Mn.	50c.
African, Indian, 49 to 51% Mn.	54c.
Brazilian, 46 to 48% Mn.	50c.
Cuban, del'd, duty free, 51% Mn.	68c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$23 to $24
Tungsten, domestic scheelite, delivered	$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	$23.50
Rhodesian, 48%	27.50



Stearns MAGNETIC CLUTCHES and DIESEL ENGINES

Note the arrow! It points to a Stearns Magnetic Clutch in a Diesel-ammonia compressor hookup . . . only one of many applications for magnetic transmission devices. They offer dependable, economical service with near or remote control. There is a size and design, also clutch and brake combination, to suit your requirement . . . extreme flexibility, smooth acceleration, fast stop. Will give you definite savings in operating costs and maintenance expense.

Consult us on your transmission problems, in your plant or product. We invite your inquiry. No obligation. We are pioneers in the development of magnetic friction devices of all kinds.

STEARNS MAGNETIC MANUFACTURING CO.
635 S. 28th St. Milwaukee, Wis.

OUR BULLETIN 225, ABOVE, IS FULL OF INTERESTING INFORMATION ON THE SUBJECT. WRITE FOR IT.

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$19.00
Domestic, f.o.b. Ohio River landing barges	19.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	19.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick	*Per 1000 f.o.b. Works*
Super-duty brick at St. Louis.	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10
Silica Brick	
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55
Chrome Brick	*Net per Ton*
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00
Magnesite Brick	
Standard f.o.b. Baltimore and Chester	$72.00
Chemically Bonded, f.o.b. Baltimore	61.00
Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross tons, $3 unitage, freight equalized with Nashville 75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

No. 3, f.o.b. Bayonne, N J.....4.50c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.4.00c.
No. 6 industrial, del'd Cleveland.3.50c.

THIS dial says "When" *automatically!* It has photo-electric control and weighs accurately (and rapidly) batch ingredients of varying kinds and quantities.

Perhaps you don't do batching or proportioning. Even so, the *basic principle* of this versatile control device may help you solve some other weighing or force measuring problem. Remember, it is accurate, rapid and automatic. It saves time and cuts costs.

And it's Toledo-built; more evidence of Toledo's superior engineering knowledge and versatility. It is another of the "45,000 Ways to Weigh"—and that's the title of a new illustrated brochure that you will find interesting, helpful, and time-saving. Send for it.

TOLEDO SCALE COMPANY, Industrial Scale Division, TOLEDO, OHIO

181 Sales and Service Offices in U. S. and Canada.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$5.00 to $5.25

Foundry, f.o.b. Connellsville, prompt .....5.50 to 5.75

F'dry, by-product, Chicago..... 10.50

F'dry, by-product, New England 13.00

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia. 11.13

F'dry, by-product, Cleveland... 11.55

F'dry, by-product, Cincinnati... 11.00

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.£17 18s.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth.£13 9s.

Beams, open hearth....£12 2s. 6d.

Channels, open hearth..£12 2s. 6d.

Angles, open hearth....£12 2s. 6d.

Black sheets, No. 24, gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.††	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown††	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

††On Oct. 25, Pittsburgh Coke & Iron Co. advanced its prices on foundry, malleable and bessemer pig iron $1.50 a ton and on basic iron $2 a ton at Sharpsville, Pa., and Youngstown. No change was made by this company in its Neville Island, Pa., quotations.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.75	4.55	4.64	4.40	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.35	7.42	7.35	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.40	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

Crucible's
REX HIGH SPEED
Steels
...Are The Overwhelming Choice of America's Leading Tool Manufacturers

...And You Get The Same Uniform High Quality When You Buy Rex High Speed Steels!

TODAY'S accent is still . . . and will continue to be . . . on QUALITY—DEPENDABILITY—UNIFORMITY . . . all the more necessary in light of today's accelerated production tempo. Leading manufacturers who are making huge quantities of tools like the above continue to rely on REX HIGH SPEED STEELS to meet their most exacting specifications. They depend on REX grades to maintain the high reputation of their products, and speed up their customers' production.

Whether or not you are similarly equipped to make exhaustive tests on incoming steel, you can safely rely on REX HIGH SPEED STEELS, because *all* REX brands are produced and inspected in our mills before shipment to conform to these exacting tool makers' standards. This is your assurance of dependability. And, the next lot you buy will be just as good, for the uniformity of REX HIGH SPEED STEELS is a tradition.

There are several types of REX HIGH SPEED STEELS . . . each outstanding for definite performance . . . and stocked in your local Crucible Warehouse or authorized distributor. Your Crucible "practical-man" will gladly survey your machining operations and give you specific recommendations. His vast background on the "Full-Range" of Specialty Steels is at your disposal. *Folder TS300 free on request.*

CHECK REX'S UNIFORM PERFORMANCE ON TOOLS LIKE THESE:

Broaches	Lathe Tools	Shaper Tools
Crowning Tools	Milling Cutters	Taps
Cutters	Planer Tools	Threading Dies
Drills	Punches	Tool Bits
Form Tools	Reamers	Wood Working Tools

Specialty Steelsmiths to INDUSTRY

CRUCIBLE STEEL COMPANY of America

CHRYSLER BUILDING • 405 LEXINGTON AVENUE • NEW YORK CITY
BRANCHES, WAREHOUSES AND DISTRIBUTORS IN PRINCIPAL CITIES

MAKERS OF HIGH SPEED, TOOL, STAINLESS, ALLOY, PRODUCTION AND SPECIAL PURPOSE STEELS

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **New England Aircraft School, Inc.,** 29 Brookline Avenue, Boston, has let general contract to B. R. Switzer Co., 39 Warren Street, Charlestown, Mass., for new two-story and basement aviation school, 90 x 165 ft., on Maverick Street Extension, East Boston, with machine shop and other mechanical instruction facilities. Cost about $90,000 with equipment. Kendall, Taylor & Co., 221 Columbus Avenue, Boston, are architects.

Segal Lock & Hardware Co., 395 Broadway, New York, plans one-story addition to plant at Norwalk, Conn., 100 x 200 ft. Cost close to $75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for three motor-driven engine lathes for stations at Wickford, R. I., Jacksonville, Fla., and Corpus Christi, Tex. (Schedule 3935).

Bethlehem Steel Co., Shipbuilding Division, Quincy, Mass., has let contract to Foundation Co., 120 Liberty Street, New York, for foundations for new shipbuilding plant on Fore River, supplementing present yard. It will comprise two large shipways for construction of battleships, wet basin, docks, wharves, mechanical shops and other structures. Project will be carried out in cooperation with Navy Department, Washington, which will provide fund of $13,427,000 for entire plant, including equipment. Fay, Spofford & Thorndike, 11 Beacon Street, Boston, are consulting engineers.

Connecticut Power Co., New London, Conn., will proceed with expansion at steam-electric generating station at Stamford, Conn., to include installation of new 25,000-kw. turbine-generator unit, high-pressure boilers and auxiliary equipment. Cost about $3,500,000. Generator unit will be furnished by General Electric Co., and awards for other equipment will be made soon.

City Airport Department, Hartford, Conn., plans one-story machine shop, 50 x 88 ft., at municipal airport, Brainard Field. Cost close to $45,000 with equipment. City Architectural Bureau, 550 Main Street, is architect.

Remington Arms Co., Bridgeport, Conn., will build new plant at Lake City, near Independence, Mo., for production of small arms ammunition for Government. It will comprise one and multi-story production buildings, shops, power house and auxiliary structures. Cost about $12,000,000 with equipment. Site has been acquired by War Department, which will furnish funds for project. Construction and operation will be carried out on cost-plus basis.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, industrial chemicals, etc., plans two-story addition to branch plant on Wilkinson Boulevard, Charlotte, N. C. Also will erect new two-story air-conditioned office building. Cost over $100,000 with equipment.

Tube Reducing Corp., 292 Madison Avenue, New York, carbon steel and alloy steel tubing, etc., has let general contract to Deakman, Wells Co., 921 Bergen Avenue, Jersey City, N. J., for new one-story plant, 100 x 320 ft., at Wallington, N. J. Cost close to $125,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 22 for 54 hull and fittings for 100-ft. overall submarine chasers, installation of machinery complete, and finishing of spare parts, for Brooklyn Navy Yard (Schedule 3891).

Public Works Officer, Naval Ordnance Plant, Baldwin, N. Y., plans one-story ammunition loading building. Cost about $53,000. Appropriation in that amount has been arranged.

Curtiss-Wright Corp., 30 Rockefeller Plaza, New York, airplanes and parts, will break ground at once for new plant adjoining Buffalo airport, where 124 acres recently was acquired. It will consist of three main one and multi-story buildings, 600 x 1400 ft., 100 x 900 ft., and 50 x 450 ft., first two noted to be used for parts production, assembling, testing and other service, and last mentioned for office and general operations. Cost close to $16,000,000 with machinery. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, has let general contract to W. L. Dunn, Cochranton, Pa., for one-story addition to branch plant at Franklin, Pa., 60 x 250 ft. Cost close to $100,000 with equipment.

General Railway Signal Co., 801 West Avenue, Rochester, N. Y., has purchased for expansion local plant of American Woodworking Machinery Co. for a consideration of about $223,000. Structures will be modernized for manufacture of ammunition components for Government, for which company has contract.

Buffalo Niagara Electric Corp., Electric Building, Buffalo, has authorized expansion in local Charles R. Huntley steam-electric generating station, including new 80,000-kw. turbine-generator unit, high-pressure boilers and auxiliary equipment. Cost about $6,000,000.

Eclipse Machine Division, Bendix Aviation Corp., Eighteenth Street and Oakwood Avenue, Elmira, N. Y., coaster brakes and parts, hose couplings, etc., will begin work soon on one-story addition, 400 x 400 ft., including power house. Cost over $300,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 18 for 1,000,000 loaded time and super-quick fuzes (Circular 986); until Nov. 19, metal parts for 14,740 igniting fuzes; parts for 1,474,000 for load, assembly and pack fuzes (Circular 1001).

Wright Aeronautical Corp., 132 Beckwith Avenue, Paterson, N. J., airplane engines and parts, has leased former textile mill of National Dyeing & Printing Co., East Paterson, comprising one and multi-story building of about 433,000 sq. ft. of floor space, and will remodel for branch plant for production of gears, cams and other parts.

Merck & Co., Inc., Lincoln Avenue, Rahway, N. J., drugs, chemicals, etc., has let general contract to White Construction Co., 95 Madison Avenue, New York, for three-story and basement addition, 72 x 135 ft. Cost over $150,000 with equipment.

DeLaval Steam Turbine Co., Nottingham Way, Trenton, N. J., turbine engines, compressors, pumps, etc., has low bid from J. W. Ferguson Co., Inc., 152 Market Street, Paterson, N. J., for four-story addition, 65 x 65 ft. Cost close to $100,000 with equipment.

Northern Bronze Corp., Tenth and Tioga Streets, Philadelphia, bronze and brass castings, etc., has acquired former textile mill of Atlas Dye Works, Inc., Torresdale Avenue and Womrath Street, on site 144 x 345 ft., and will remodel for new foundry.

Sharon Steel Corp., Sharon, Pa., has authorized expansion in local mill and at branch plant at Lowellville, Ohio, including new units and equipment. A 20-ton electric furnace and auxiliary equipment will be installed at Lowellville works. Cost close to $1,000,000 with machinery.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 20 for one-story assembling shop at naval dry docks, Hunters Point, Cal. (Specifications 10172).

Quartermaster, Marine Corps, Navy Building, Washington, asks bids until Nov. 18 for four-wheel trailers (Schedule 581).

Baltimore & Ohio Railroad Co., Baltimore, has let general contract to George F. Hazelwood Co., Cumberland, Md., for addition to engine house, with shop facilities, at Cumberland. Cost over $70,000 with equipment.

Rowan Controller Co., 2315 Homewood Avenue, Baltimore, electrical machinery and parts, has let general contract to Mullan Construction Co., 3945 Greenmount Avenue, for one-story addition for storage and distribution. Cost about $40,000 with equipment. Cyril H. Hebrank, 20 East Lexington Street, is architect.

War Department, Washington, has let contracts to Virginia Engineering Co., Nelson Building, Newport News, Va., and Wise Contracting Co., 122 North Eighth Street, Richmond, Va., for ammunition buildings and facilities at naval fuel depot, Yorktown, Va. Cost over $4,000,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for one self-contained rotary shear (Schedule 3919), turbo-compressor type air blower (Schedule 3925), press brake (Schedule 3966), bending roll (Schedule 3920), threading machine (Schedule 3929), three 12-in. swing woodworking lathes (Schedule 3895), toolroom precision lathes (Schedule 3952), upright drilling machines (Schedule 3924), geared-head engine lathes (Schedule 3918), pipe and nipple threading machines (Schedule 3963), all motor-driven; steel air flasks (Schedule 3979), storage batteries (Schedule 3987), flexible steel cable (Schedule 3927) hydraulic flanging press (Schedule 3961), welding steel electrodes (Schedule 3936) for Eastern and Western Navy yards.

Liberty Tool & Gage Works, Inc., 235 Georgia Ave., Providence, R. I., has awarded contract to Bigney Construction Co., 44 Franklin Street, Providence, for a plant addition.

The South

• **Peoples Packing Co.,** Lakeland, Fla., canner and packer, has approved plans for new one-story fruit-processing and canning plant. Cost close to $50,000 with equipment. R. R. Ross is company engineer in charge.

Tennessee Valley Authority, Knoxville, Tenn., will take over old nitrate plant of Government at Muscle Shoals, Ala., and will modernize for production of ammonium nitrate; also will have plans drawn at once for new synthetic ammonia-manufacturing plant, to include power substation, machine and other mechanical shops, pumping station and other structures. Part of plant will be equipped for production of commercial fertilizer. Fund of about $6,500,000 has been authorized for work. Department of Chemical Engineering will be in charge.

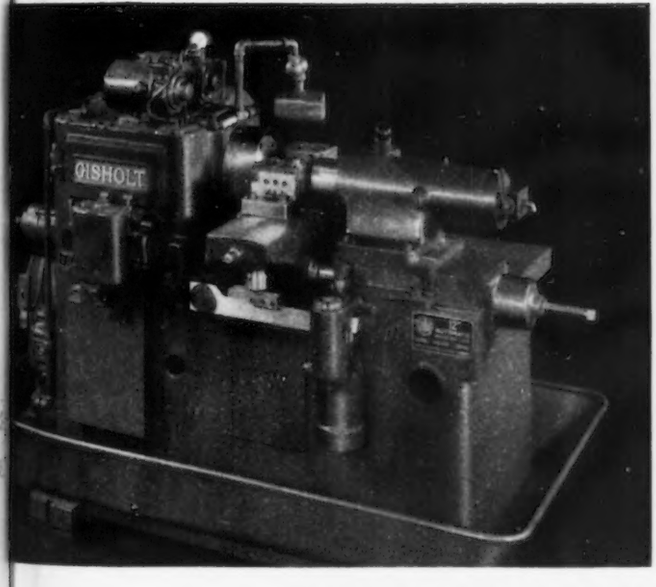
Armstrong Tire & Rubber Co., Natchez, Miss., has let general contract to Hillyer & Lovan, Inc., 1111 West Ashley Street, Jacksonville, Fla., for five-story addition, 200 x 200 ft., for storage and distribution. Cost over $200,000 with equipment. J. T. Canizaro, Lampton Building, Jackson, Miss., is architect.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Nov. 18 for steel stop log guides and steel trash racks for spillway at Cherokee Dam.

For
THE NEED
OF THE
HOUR

Speed-accuracy-power!

The New GISHOLT No. 12 Automatic Production Lathe



WHERE overloaded schedules require faster production—where quick setups are desired to handle a variety of between-centers and chucking work . . . look to this new Gisholt No. 12 Hydraulic Automatic Lathe.

Above, you see it machining Diesel engine injector bodies 42% faster than the automatic lathe it replaced. Tests in other plants show time and cost savings as high as 82%.

Ideal for the production of cluster gears, bevel gears, differential carriers, medium caliber shells and a wide variety of cylindrical parts, this highly advanced machine is fast, accurate, simple to operate. It is extremely flexible, with an unlimited change of pace in speeds and feeds. Ask your nearest Gisholt representative to tell you about it.

★ *The Gisholt No. 12 Automatic Production Lathe is hydraulically operated, and all its functions are controlled with a single lever centrally located. The operator has only to start machine; chuck and unchuck the work. Tools cut to close tolerances and may be re-set by means of micrometer adjustments. Write for literature.*

"YOUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS"

GISHOLT

GISHOLT MACHINE COMPANY

1215 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.

TURRET LATHES · AUTOMATIC LATHES · BALANCING MACHINES

Municipal Water Department, Little Rock, Ark., asks bids until Dec. 4 for electric pumping machinery and accessories, 5000 gal. per min. capacity, for municipal pumping plant on Arkansas River.

Haase-Davis Packing Co., Mobile, Ala., meat packer, has let general contract to J. F. Pate, First National Bank Building Annex, for one-story addition. Cost close to $45,000 with equipment.

City Council, Bay St. Louis, Miss., H. Grady Perkins, clerk, asks bids until Nov. 18 for natural gas engine-driven deep-well pumping unit and accessories for municipal waterworks station.

Quartermaster General, Washington, will take bids soon for new Federal airfield at West Palm Beach, Fla., including hangar, oil and gasoline storage and distribution tanks and system, machine and repair shops, and other structures. Appropriation of $1,736,000 has been authorized.

Central States

● **Steel Products Engineering Co.,** West Main Street, Springfield, Ohio, mechanical stokers and parts, gears, etc., has asked bids on general contract for one-story addition, 90 x 200 ft.; also will remodel part of present plant. Cost close to $100,000 with equipment. Lloyd J. Zeller, Inc., 2 West Columbia Street, is architect.

Peninsular Steel Co., 2222 Lakeside Avenue, Cleveland, plans one-story branch, 50 x 100 ft., at Dayton, Ohio, for storage and distribution. Cost close to $40,000 with equipment. Dayton offices are at 905 East Third Street.

Sterling Foundry Co., Wellington, Ohio, will take bids soon on general contract for one-story addition, 70 x 100 ft., for expansion in core room and other departments. Cost about $45,000 with equipment.

Humphryes Mfg. Co., Mansfield, Ohio, plumbing fixtures, pumps, etc., plans new steam power house, 38 x 50 ft. Cost over $50,000 with boilers and other equipment. George S. Rider Co., Terminal Tower Building, Cleveland, is engineer.

Hoover Sweeper Co., North Canton, Ohio, vacuum cleaners and parts, has let general contract to Warren-Hoffman Co., 312 Third Street, N. W., for four-story addition, 80 x 120 ft. Cost over $350,000 with equipment. C. E. Firestone, 1342 Cleveland Avenue, N. W., Canton, is architect.

Perfect Circle Co., Inc., Hagerstown, Ind., piston rings, etc., has let general contract to Carl M. Geupel Construction Co., Hume-Mansur Building, Indianapolis, for one-story addition, 20 x 300 ft., and two adjoining one-story units, each about 38 x 50 ft. Cost over $150,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer.

Marmon-Herrington Co., Inc., 1511 West Washington Street, Indianapolis, automobiles and parts, has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for one-story steam power house, 41 x 53 ft. Cost over $50,000 with boilers and other equipment.

Shell Oil Co., Shell Oil Building, St. Louis, has approved plans for addition to oil refinery at Deer Park, near Houston, Tex., for production of toluol, a petroleum by-product used in manufacture of high explosives. Cost about $500,000 with equipment.

Topeka Steam Boiler Works, Inc., 135 Jefferson Street, Topeka, Kan., boilers, tanks, etc., plans one-story addition, about 30 x 100 ft. Cost close to $40,000 with equipment.

Hussman-Ligonier Co., 2401 North Leffingwell Street, St. Louis, refrigerators, scales, choppers, etc., has let general contract to William H. & Nelson Cunliff Co., 3320 Lindell Boulevard, for one-story addition for storage and distribution. Cost close to $40,000 with equipment. George Neff, last noted address, is architect.

John C. Kupferle Foundry Co., 2822 North First Street, St. Louis, plumbers' brass goods, brass and bronze castings, has let general contract to Construction Service Co., Wainwright Building, for one-story addition. Cost close to $45,000 with equipment. William Wedemeyer & Son, Wainwright Building, are architects.

Humble Oil & Refining Co., Humble Building, Houston, Tex., has approved plans for expansion and improvements in oil refinery at Baytown, Tex., including new buildings and equipment. Cost about $1,097,000 with machinery. Company also will build plant on adjoining site for production of toluol for Government, to be known as Baytown Ordnance Works, with power station, shops and other facilities. Cost about $10,760,000 with machinery. War Department, Washington, has arranged appropriations in amounts noted in both instances.

Motor Products Corp., 11801 Mack Avenue, Detroit, automobile equipment and parts, has let general contract to Albert A. Albrecht Co., Penobscot Building, for one-story addition for storage and distribution. Cost close to $60,000 with equipment. Smith, Hinchman & Grylls, Inc., Marquette Building, is architect.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, automobile bodies, etc., has let general contract to W. E. Wood Co., 4649 Humboldt Street, for extensions and improvements in plant on Conner Avenue. Cost about $175,000 with equipment.

Ex-Cell-O Corp., 1200 Oakman Boulevard, Detroit, tools, airplane parts, special machinery, etc., has acquired 15-acre tract, with one and two-story building of about 125,000 sq. ft. of floor space, at Highland Park, Mich., for increased production. Additional units are planned at same location in future. Cost close to $1,700,000 with equipment.

D. Gottlieb & Co., 2736 North Paulina Street, Chicago, vending machines and parts, have let general contract to Benjamin Chemers, 111 West Washington Street, for new one-story plant at Kostner and Haddon Avenues, 120 x 210 ft. Cost over $85,000 with equipment. A Epstein, 2001 West Pershing Road, is engineer.

Paragon Electric Co., 842 South Twenty-sixth Street, Manitowoc, Wis., electric time switches and other electrical devices, plans new one-story plant, 75 x 300 ft. Cost over $100,000 with equipment. Frazier & Raftery, 540 North Michigan Avenue, Chicago, are architects.

LaPlant-Choate Mfg. Co., Inc., First Avenue S. E., Cedar Rapids, Iowa, steel dump wagons, trailers, tractors, etc., plans one-story addition, 80 x 180 ft. Cost close to $85,000 with equipment.

Butler Mfg. Co., Inc., 7400 East Thirteenth Street, Kansas City, Mo., steel tanks, steel buildings, bins, etc., has taken out permit for one-story addition, 100 x 102 ft., to branch plant at Minneapolis, Minn., for storage and distribution; also for boiler house. Cost about $45,000 with equipment.

MacWhyte Co., 2906 Fourteenth Avenue, Kenosha, Wis., wire rope, has let general contract to Austin Co., Cleveland, for one-story addition, 50 x 100 ft. Cost close to $45,000 with equipment.

Globe Machinery & Supply Co., 205 Court Street, Des Moines, Iowa, has let general contract to Weitz Co., Inc., 713 Mulberry Street, for one-story addition for storage and distribution. Cost over $40,000 with equipment. Proudfoot, Rawson, Brooks & Borg, Hubbell Building, are architects.

Charles Bruning Co., Inc., 445 South Plymouth Street, Chicago, blue printing machines, parts, etc., has let general contract to B-W Construction Co., Inc., 307 North Michigan Avenue, for one and two-story addition to plant at 1134 West Hubbard Street. Cost over $60,000 with equipment. Victor L. Charn, 332 South LaSalle Street, is architect.

Whitney Metal Tool Co., 110 Forbes Street, Rockford, Ill., metal-working machinery and parts, punches and shears, has let general contract to Linden & Sons, Inc., 1102 Tenth Street, for one-story addition, 26 x 70 ft., for storage and distribution. Cost close to $40,000 with equipment.

Industrial Screw & Supply Co., 1438 North Wells Street, Chicago, hardware, has leased about 12,000 sq. ft. of floor space in building at 711 West Lake Street for expansion.

Midland Wire Corp., Tiffin, Ohio, has purchased seven acres adjacent to its factory and will erect an addition, 75 x 125 ft.

Western States

● **Pacific Carbide & Alloys Corp.,** North Columbia Boulevard and Hurst Street, Portland, plans additional unit at new plant now in course of construction at location noted. Cost over $200,000 with equipment. L. H. Hoffman, 715 S. W. Columbia Street, is contractor for present plant.

Municipal Airport Department, City Hall, Los Angeles, has authorized plans for expansion in municipal airport, Mines Field, West Imperial Highway, including new steel hangars with shop and reconditioning facilities, mail-handling and administration buildings and auxiliary units. A bond issue of $976,000 is available for work. City engineer, first noted address, is in charge.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two diesel-electric traveling jib cranes for Naval supply depot, Oakland, Cal. (Specifications 10174).

Byron-Jackson Co., 2150 East Slauson Avenue, Vernon, Los Angeles, pumping machinery, parts, etc., has let general contract to C. L. Peck, 354 South Spring Street, Los Angeles, for one-story plant addition, 120 x 300 ft. Cost close to $175,000 with equipment. Edward C. and Ellis W. Taylor, 803 West Third Street, are architects.

Aluminum Co. of America, Inc., 5151 Magnolia Avenue, Vernon, Los Angeles, has filed plans for three one-story additions, including hammer shop, 20 x 320 ft.; foundry, 80 x 120 ft., and extension in boiler house, 40 x 40 ft. Cost close to $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for 140,000 ft. of wire rope (Schedule 3889), 8500 lb. of corrosion-resisting steel welding electrodes (Schedule 3936) for Mare Island Navy Yard; four turbine-driven circulating pumps and spare parts (Schedule 3981) for Puget Sound yard.

Pepsi-Cola Co., Portland, has leased one-story building, 100 x 100 ft., to be erected by Carl B. Salts, Mead Building, at N. E. Pacific and Twenty-seventh Streets, for new mechanical-bottling, storage and distributing plant. Cost close to $65,000 with equipment. Erection contract has been let to Ward & Milbrandt, 4232 N. E. Sandy Street. Arthur P. Cramer, Bedell Building, is engineer.

Canada

● **Allied War Supplies Corp.,** Toronto, recently organized as a Government-owned company, has let general contract to Carter-Halls-Aldinger, Ltd., 419 Cherry Street, for new shell-loading plant on lake shore near city, where about 3000 acres has been secured. Cost over $5,000,000 with equipment.

Procter & Gamble of Canada, Ltd., 39 Burlington Street East, Hamilton, Ont., soaps, edible oils and allied products, subsidiary of Procter & Gamble Co., Cincinnati, has let general contract to W. H. Cooper Construction Co., Ltd., Medical Arts Building, for one-story addition. Cost close to $50,000 with equipment.

John E. Livingstone Machine Co., Ltd., Hamilton, Ont., machinery and parts, plans one-story addition. Cost about $60,000 with equipment.